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December 10, 2021

Commissioner Kennedy  
**Arizona Corporation Commission**  
1200 W. Washington Ave.  
Phoenix, AZ 85007

**Re: In the matter of the 90 Day pre-application plans filed pursuant to A.R.S. 40-360.02.B (Docket No. E-00000M-08-0170)**

Dear Commissioner Kennedy,

On behalf of Salt River Project Agricultural Improvement and Power District (SRP), thank you for the opportunity to respond to your questions regarding our proposed Coolidge Expansion Project put forth in your letter that was docketed on November 19, 2021.

As requested in your letter, please find our responses in the attached document. As always, if you or your staff have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Mike Hummel", is written over a light blue horizontal line.

Mike Hummel  
SRP General Manager & CEO

# Attachment A

1. **A.R.S. §40-360.06(A)8 states the Power Plant and Transmission Line Siting Committee and the Commission *shall* consider the “...potential increase in the cost of electric energy to the customers...” when responding to a CEC application.**

- a. **What is the expected rate impact to SRP ratepayers resulting from this Project?**

As a community-based not-for-profit entity, SRP seeks to minimize costs for customers. Given SRP's expected electric peak load growth and the obligation to serve our customers, the Coolidge Expansion Project (CEP) represents the lowest cost option that best meets our system needs, balancing affordability, reliability, and sustainability.

SRP recognizes that A.R.S. §40-360.06(A)8 requires the Arizona Power Plant and Transmission Line Siting Committee to consider the “estimated cost of the facilities and site as proposed by the applicant and the estimated cost of the facilities and site as recommended by the committee, recognizing that any significant increase in costs represents a potential increase in the cost of electric energy to the customers or the applicant.” While the Committee is required to consider the costs of the facilities being proposed, and the costs of any changes made by the Committee through conditions, the impact on rates is a much broader analysis that also would take into consideration numerous other changes in overall corporate and system costs as well as any additional revenue as a result of growth on our system. As you know, pursuant to Arizona statutes, SRP rates are and will be determined by the publicly elected SRP Board of Directors, which conducts a public price process. SRP rates are not determined by the Arizona Corporation Commission.

SRP is committed to delivering affordable, reliable and sustainable power to our customers and it has a proven track record in doing so.

- b. **What is the expected rate impact specifically on low-income SRP ratepayers?**

See response from 1a above. SRP customers with limited incomes will continue to pay our overall low rates as our other customers experience and can also receive a \$23 monthly discount (\$276/year) on their SRP electric bills through the Economy Price Plan.

2. **Did SRP conduct an all-source RFP to determine the most economic option(s) available to meet its needs in this case?**

While SRP did not conduct a separate dedicated all-source RFP for capacity alternatives to the CEP, SRP had recently conducted competitive RFP processes that supported its economic comparison of the CEP against alternatives. SRP had current market pricing it obtained through a competitive Request for Proposals (RFP) for solar and a Request for Information (RFI) for wind projects, both conducted in 2020. These processes provided SRP with an adequate indication of market prices and projects that could be operational by 2024. As described below in the response to Question #3, there were limited resource options that could meet SRP's significant capacity and flexibility needs in the timeframe required.

3. **If the answer to the above questions is no, please provide the analysis conducted by SRP and/or any consultants concerning the viability of the Project including examinations of alternatives. This should include any inputs, assumptions, scenarios, studies, and factors considered. An executive summary or similar summary materials alone will not be sufficient.**

SRP's review and analysis of resource alternatives was presented to SRP's Board of Directors at meetings of the Power Committee on August 24, 2021, and Board of Directors for approval on September 13, 2021, to inform the Board's decision on the CEP. The presentations provided to the Board at those meetings are enclosed as Attachments B and C. These meetings were publicly noticed and open to the public to attend.



Your letter requested “any” input considered by SRP relative to the CEP. In this response, SRP is providing the information you requested and attaching copies of the non-confidential materials referred to and used relative to this decision. SRP does have additional material that is covered by various non-disclosure agreements with third parties or is competitively confidential and not subject to disclosure. SRP is willing to provide additional material to the extent it is legally able to do so pursuant to an appropriate protective order or agreement. SRP believes that the information below and the material produced with this letter is sufficient to respond to your letter.

### **Resource Need**

As shown on Slide 3 of the Power Committee presentation, SRP is experiencing significant and unprecedented growth in demand for electricity in its service territory. To meet that demand, SRP is required to add a significant amount of new power generation capacity.

SRP is using an “all of the above strategy” to meet those near-term needs. Slide 4 shows the resources that SRP has added or committed to add so far to meet that near-term need. The capacity additions include 2,025 MW of solar by 2025, approximately 400 MW of battery storage, additional demand response programs, the purchase of an additional interest in Palo Verde Nuclear Generating Station, new natural gas turbines at two of our existing facilities, and upgrades at several of SRP’s existing natural gas generating stations to increase efficiency or recover the output that SRP typically loses in the summer due to higher temperatures.

Even with those additions, given the recent significant growth, SRP still has a need for over 700 MW in 2024, and at least an additional 300 MW for a total of more than 1,000 MW of additional capacity in 2025 to meet its customers’ summer peak demand. To put this in perspective, 1,000 MW represents more than 10% of SRP’s existing generation portfolio. SRP also has a need for flexible resources that can provide firm, dispatchable capacity to enable the integration of more renewable energy while maintaining the reliability of the power system. SRP’s service territory continues to grow at a significant and unprecedented rate, and SRP must ensure that we can continue to reliably serve our customers’ electricity needs.

### **Resource Alternatives Considered**

SRP considered a broad range of resource options to meet the needs described above. As noted above, SRP had current market pricing it obtained through a competitive Request for Proposals (RFP) for solar and a Request for Information (RFI) for wind projects, both conducted in 2020. These processes provided SRP with an adequate indication of market prices and projects that could be operational by 2024. After careful consideration of the alternatives, SRP management reached the following conclusions:

- Due to their intermittency, standalone solar or wind would not dependably provide the capacity needed at the summer peak.
- SRP is already maximizing its use of demand response (DR) and energy efficiency (EE), and those programs cannot practically scale to what SRP would need to achieve comparable capacity and reliability to the CEP in the timeframe needed. DR programs are important tools designed for specific applications to help reduce system peak for a limited number of hours each year, typically only 30-40 hours a year, while EE programs impact the broader load forecast. As such, these programs support SRP’s “all of the above” strategy but are not capable of meeting the incremental load requirement due to customer adoption levels and limited dispatchability.
- It would not be prudent to rely on aggregated customer-side solar and battery programs to scale to what SRP would need to achieve comparable capacity and reliability to the CEP in the timeframe needed. Customer adoption and technology integration currently do not exist at a level that would be necessary to meet SRP’s near-term resources needs.



- There are no biomass or geothermal opportunities that would be actionable by 2024 when capacity is needed.

The best resource options that could meet SRP's significant capacity and flexibility needs in the timeframe required therefore were determined to be natural gas peaking units and/or battery storage. While SRP supports battery storage and will be adding approximately 400 MW by 2023, SRP has concerns about the feasibility of adding the amount of battery storage that would be needed to achieve similar reliability to the CEP in the timeframe needed. Neither SRP nor the utility industry as a whole have much operational experience with batteries, particularly long-term operating experience. The United States has only approximately 3,200 MW of energy storage – 1,300 MW of that began operation this year, with the other 1,900 MW operating less than three years.<sup>1</sup> To put this into context, that 1,900 MW represents 0.2% of the United States' total electricity generation capacity. For these reasons, SRP determined that adding battery storage over the next three years in the amounts to achieve similar reliability as the CEP was impractical and costly, much more so than expansion of Coolidge peaking plant. SRP will remain committed to increasing battery storage at a measured pace, and that will allow SRP to gain experience as the technology evolves and realize the benefits of both decreases in battery prices and increases in storage duration that we expect to occur.

While SRP has significant feasibility and prudence concerns about adding the amount of battery storage needed to replace the CEP, in an effort to fully inform the SRP Board's resource decision, SRP staff performed an economic evaluation for the CEP that compared it with a least-cost zero carbon alternative. Below is a description of the approach, inputs and assumptions, and result of this analysis.

### **Approach**

When SRP considers investing in a new power generation resource, SRP cannot simply compare the cost of the resource options on a capacity (\$/kW) or energy (\$/MWh) basis. SRP must consider how the resource fits into the resource portfolio in the short and long-term, and how it will impact reliability, sustainability, and affordability. Therefore, to inform the SRP Board's resource decision, SRP performed an analysis in which it compared the cost of a portfolio that replaces Coolidge with zero-carbon resources ("the zero-carbon portfolio") that would be required to achieve similar levels of power system reliability with the portfolio that includes the CEP ("the Coolidge portfolio").

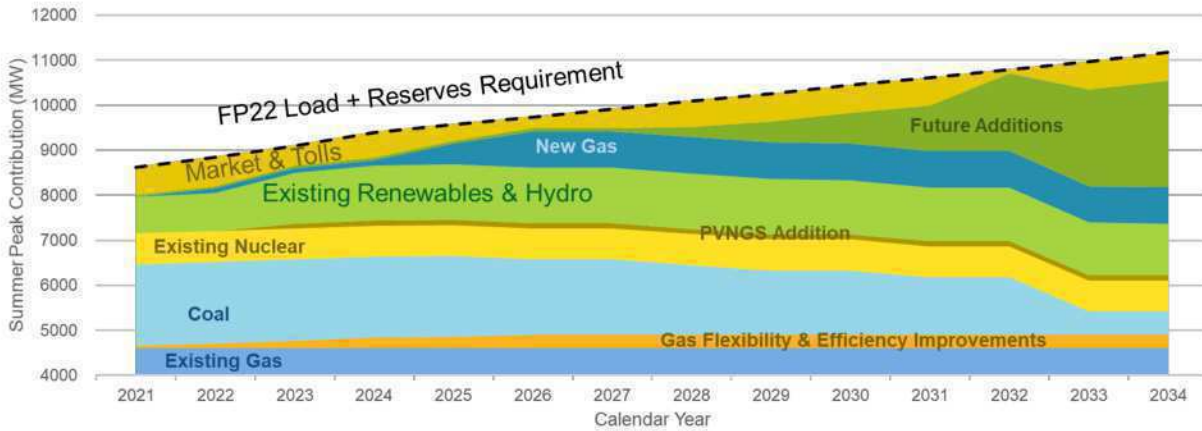
Two different approaches were used to develop zero-carbon portfolio alternatives:

1. SRP used Energy Exemplar's Aurora resource planning model to build a portfolio of zero-carbon alternative resources that could achieve similar reliability as the CEP.
2. As a sensitivity and to provide an independent perspective, SRP also retained E3, an economic and environmental consulting firm, to run their proprietary resource planning models to build a portfolio of alternative zero-carbon resources that could achieve similar reliability as the CEP.

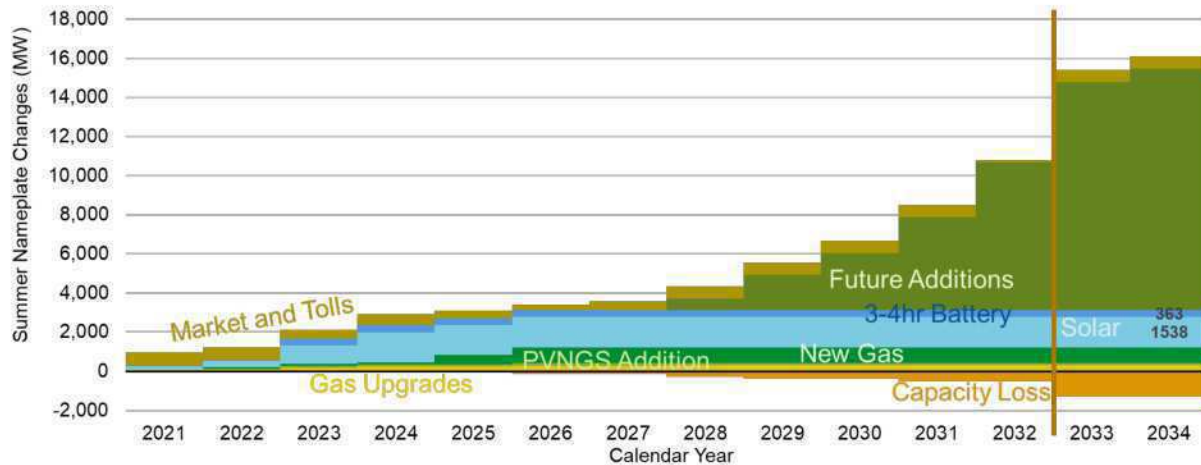
### **Inputs and Assumptions**

<sup>1</sup> ACP, "Clean Power Quarterly Report Q3 2021," ACP, October 25, 2021, <https://cleanpower.org/resources/clean-power-quarterly-report-q3-2021/>.

## Load Forecast



## Resource Additions



## CEP Inputs

- CEP includes 8 units to be online for summer 2025 and 8 units online for summer 2026
- Nameplate capacity is 820 MW for 16 units
- Summer capacity in summer 2025 (352 MW) and summer 2026 (352 MW)

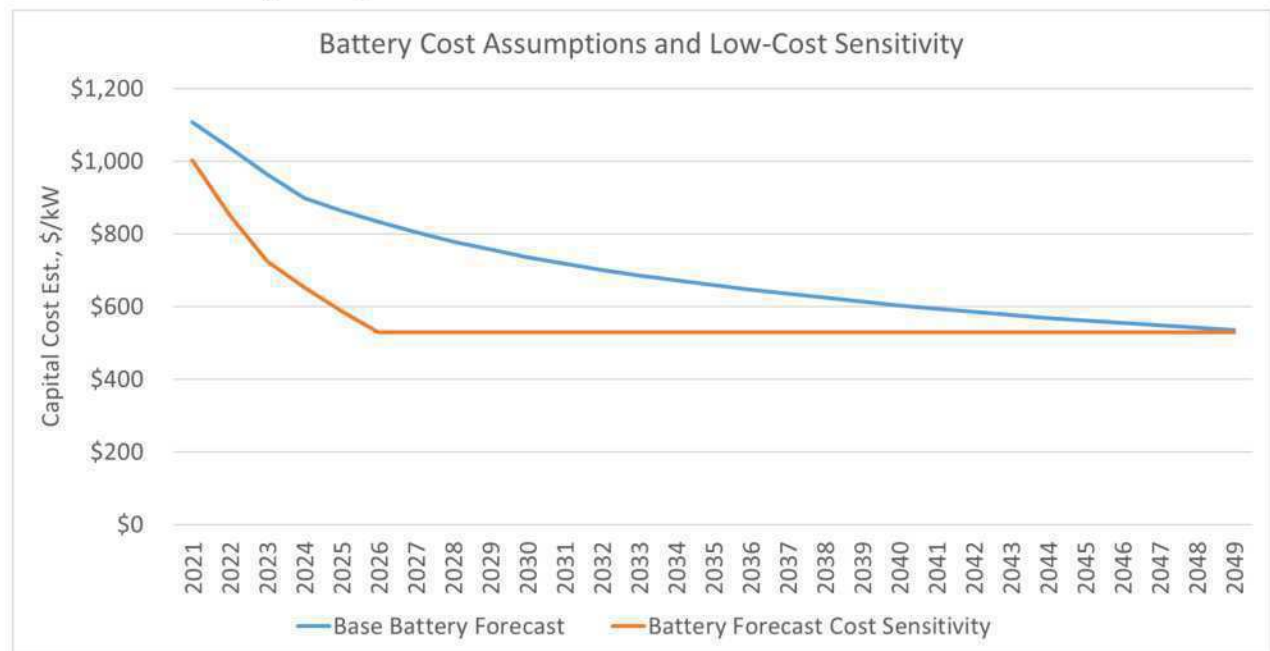
<sup>2</sup> The economic analysis was conducted prior to accelerating CEP to 2024-2025

- Operating characteristics:
- Fixed Operation & Maintenance Costs: \$244.62/MW-Week
- Forced Outage: 6% applied as an hourly derate
- Maintenance Rate: 1.1% in January – May and November – December, applied as an hourly derate
- CO2 Emissions: 118 lb/mmBtu
- Capital costs used in economic analysis: \$958/kW

### Solar and Storage Technology

SRP's solar and storage technology cost assumptions used in this analysis are based on SRP's research, which is informed by a blend of public and vendor-supplied information, calibrated to SRP's own procurement activities, including resource negotiations and received proposals. SRP also explored a sensitivity in which it assumed that battery technology costs fall faster than currently projected.

- 4-Hour Battery Storage Costs



- Solar Costs: \$7.77 /kW-month
- Solar and Storage Costs: \$10.99 /kW-month

### Hydrogen

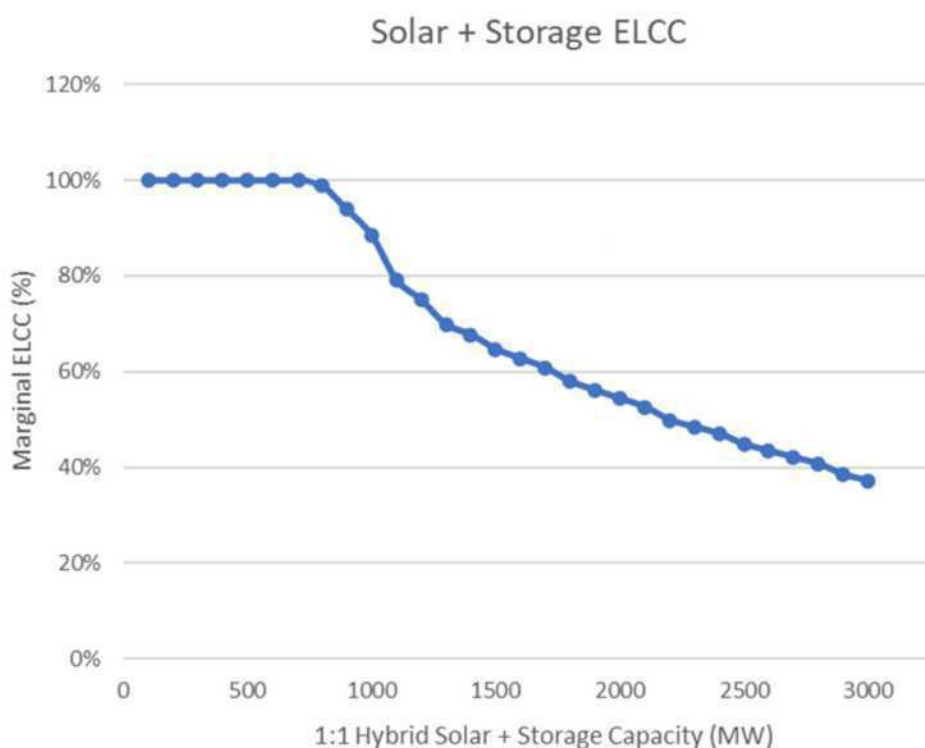
In the SRP alternative portfolio an additional 550 MW hydrogen combustion turbine provides firm capacity beginning in FY34, as SRP's estimate of the decreasing Effective Load Carrying Capability of hybrid solar and storage resources would drive significantly higher system costs for an alternate portfolio that only includes solar and storage (see Effective Load Carrying Capability description below). The hydrogen-capable combustion turbine burns blended methane gas/hydrogen fuel until 2045, when it is assumed to



burn hydrogen only. The cost and operating characteristics of the combustion turbine are commensurate with methane-burning combustion turbines. The hydrogen cost for blending is assumed to be "green-hydrogen," with costs informed by the Electric Power Research Institute (EPRI) and Bloomberg New Energy Finance (BNEF) research.

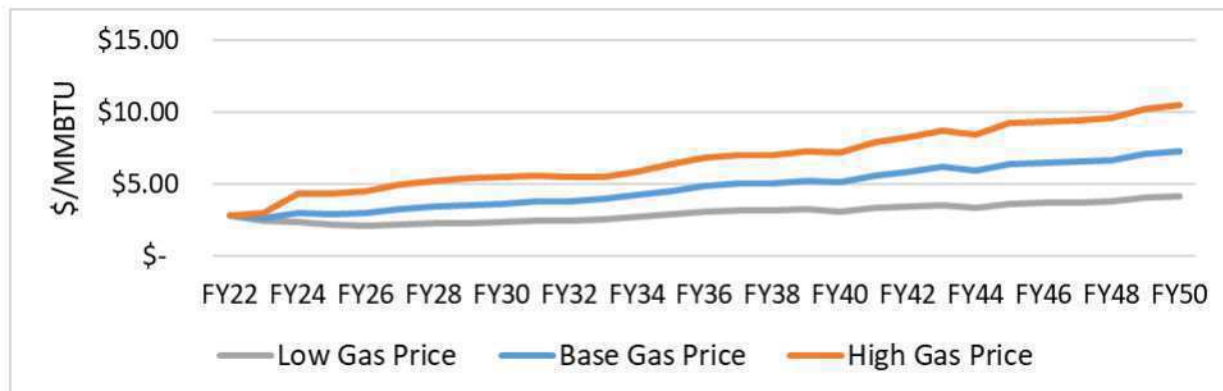
#### Effective Load Carrying Capability (ELCC)

Effective Load Carrying Capability is a measurement of a resource or combination of resources' ability to provide reliable capacity when it is needed. The calculation of this measurement includes sophisticated statistical modeling techniques varying future possibilities of demand, weather, and unplanned generation and transmission outages. This is an increasingly important metric to define resource adequacy as more utilities, including SRP, retire conventional generation and incorporate larger amounts of variable or limited duration technologies onto the power grid.



#### Gas Prices

SRP considered a range of gas price forecasts as a sensitivity in this analysis. The range of prices considered is shown in the graphic below. Gas Prices and the illustrated ranges are based on a blend of vendor data and market quotes.



## Results

As a result of the variability of renewables like solar and wind, and the limited duration of battery storage, SRP concluded that it would need to build 3-4 times the nameplate capacity of zero-carbon resources to achieve similar reliability as the CEP.

Even at 3-4 times the capacity, there is still inherent risk in the reliability performance of limited duration resources. There is no long-term industry performance data to validate these performance levels, and many more questions to answer in terms of degradation, forced outage rates and states of charge.

While SRP has reliability concerns with the alternative portfolio, SRP calculated the cost of the zero-carbon portfolio options in comparison to a portfolio with the CEP over a period of 30 years, our typical resource planning horizon. The CEP portfolio was the lowest cost option in all scenarios, including scenarios with high gas prices and low battery technology costs, and did not impact SRP's ability to meet or exceed its Board-established carbon intensity reduction commitments. SRP's CEP portfolio resulted in \$342 million to \$872 million of savings (in today's dollars) compared to the zero-carbon portfolio. This analysis demonstrates that the addition of flexible natural gas peaking units is not just the most prudent and practical decision, but also is the best economic decision that provides the most value to SRP's customers.

## Site Considerations

Since flexible natural gas peaking units were determined to be the most prudent and economic choice, SRP considered a number of options for locations where these units could be sited. SRP acquired the Coolidge Generating Station from TransCanada in 2019. One of the key strategic reasons for the acquisition was the potential to expand the facility to include additional flexible natural gas units, since that was consistent with SRP's Integrated Resource Plan strategic directions. The acquisition of the Coolidge Generating Station included 100 acres of additional land to the south of the existing site that would accommodate expansion, making it an ideal location to add additional capacity.

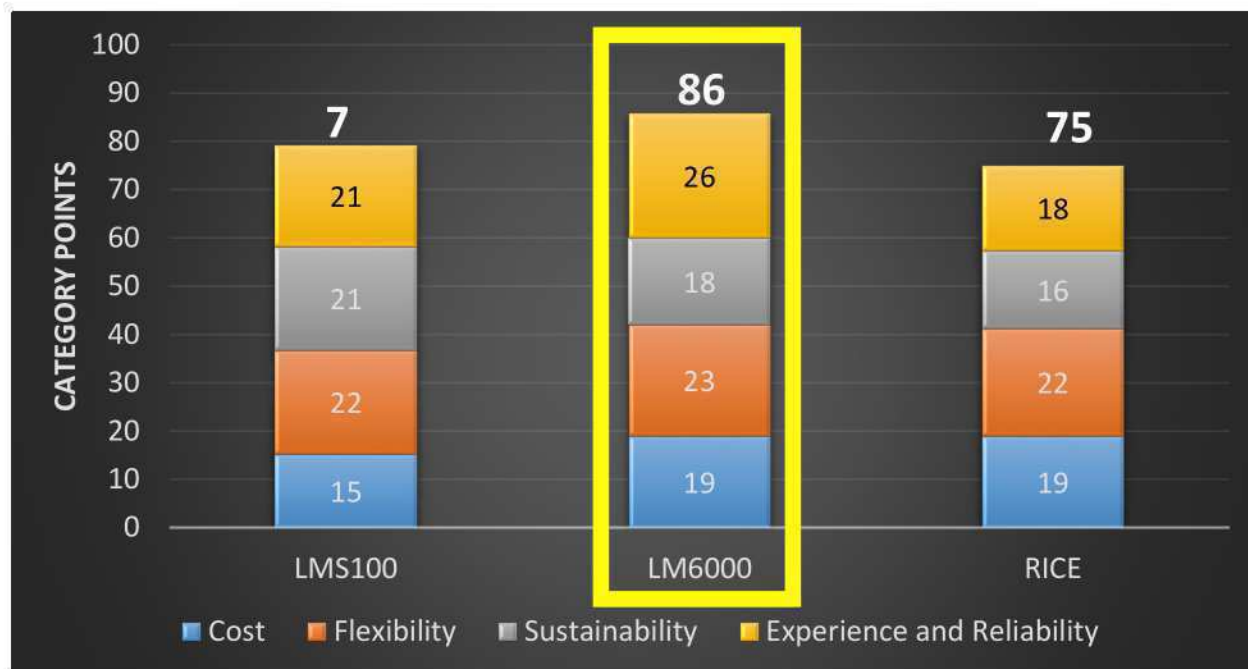
The expansion of an existing site provides advantages to developing a new power generation site. The existing site and proposed expansion are within an area previously planned and zoned by the City of Coolidge for industrial uses. The existing site allows access to critical infrastructure including transmission, fuel, and water eliminating the need to develop or construct new off-site transmission or pipelines minimizing environmental impacts and reducing the cost of the project. Construction of overhead transmission lines can cost up to \$2 million per mile and underground gas pipelines up to \$10 million per mile so the ability to utilize existing infrastructure represents significant savings. The CEP

location will better balance generation in the East Valley with the large amount of resources interconnected at or near the Palo Verde Hub west of Phoenix. This balance will help optimize the overall transfer capability, reliability, and flexibility of SRP's transmission system. The CEP is also favorably situated to provide voltage support and improve Valley-wide load serving capabilities.

#### Turbine Technology Comparison

Since flexible natural gas peaking units were determined to be the most prudent and economic choice, SRP performed a detailed comparison of the options available. A cross-functional internal team from several SRP departments evaluated turbine technology based upon flexibility, sustainability, reliability, operational experience, and cost. The results of the evaluation are shown in the matrix below.

The LM6000 turbines are flexible resources that allow SRP to integrate more renewables into the power system. The turbines can start up and change output quickly to support the variability of renewable resources. In addition, the flexibility of this technology allows us to operate just one or two turbines when needed, versus having to run all of them at the same time. SRP must reliably meet near-term capacity needs, and the LM6000 turbines are available to provide power when needed, including during outages of other units or when limited-duration resources are unavailable. The LM6000 model is an industry leader in reliability with over 40 million operating hours and over 99% reliability. In addition, the existing Coolidge Generating Station utilizes the LM6000 technology, providing operational familiarity and common spare parts to reduce maintenance costs.



SRP also retained a third-party engineering firm, Power Engineers, to perform an independent review of SRP's comparison of the options. Power Engineers supported SRP's conclusion that the LM6000 turbines represent the best technology choice to meet SRP's resource needs, as documented in the memo enclosed in Attachment D.

#### Additional Inputs





As mentioned above, there are other inputs, assumptions, scenarios, studies, and factors considered in this analysis contain competitively sensitive information or information that is protected under Non-Disclosure Agreements with third parties. If additional detail is desired beyond what SRP has provided in this response, SRP is willing to discuss other approaches to submitting this data in a way that protects confidentiality.

- 4. In its 2018 Integrated Resource Plan SRP states “prior to making any financial commitments to major equipment or construction contracts for new-build generation, issue all-source RFPs for the planned capacity. That capacity will explicitly include the opportunity for cost competitive and viable energy storage and demand response options.” Did SRP follow this guidance in this case?**

While SRP did not conduct a separate dedicated All-Source RFP for capacity alternatives to the CEP, SRP had recently conducted competitive RFP processes that supported its economic comparison of the CEP against alternatives. As explained in the response to Question #2, SRP had current market pricing it obtained through a competitive Request for Proposals (RFP) for solar and a Request for Information (RFI) for wind projects, both conducted in 2020. These processes provided SRP with an adequate indication of market prices and projects that could be operational by 2024. SRP had sufficient information to perform an economic comparison between the CEP and a least cost zero-carbon alternative. That analysis demonstrated that the CEP was the least cost alternative, even in scenarios with high gas prices and battery technology costs that fall faster than forecasts predict.

It is also important to note that SRP did not select the CEP at the exclusion of other resource options – rather, the CEP provides firm, dispatchable, flexible capacity – a reliability backbone – upon which SRP can add more intermittent and variable resources to meet significant near-term needs while maintaining a reliable power system. SRP is fully leveraging these additional resources and is utilizing an “all of the above” approach for resource additions in this timeframe. SRP has committed to 2025 MW of solar by 2025 and approximately 400 MW of battery storage by 2023. Regarding demand response and energy efficiency, SRP is also already maximizing opportunities and the programs cannot practically scale to what SRP would need to achieve comparable capacity and reliability to the CEP in the timeframe needed. As shared during the ISP Summer Stakeholders Series, the growth of our demand response portfolio has been accelerated from 67MW to our planned 150MW total by the end of the summer in 2022. This growth is aggressive and is limited by the current market penetration of controllable devices and customer adoption. From an energy efficiency perspective, our demand response portfolio is already one of largest in the West and the ability to add incremental impact to our load forecast is limited by finite market potential and the timing of the needed resource.

SRP will still need additional capacity beyond all the resources mentioned above. With the benefit of the reliability backbone provided by the CEP, SRP can consider a broader range of technology options to serve the balance of additional near-term power generation needs. Accordingly, SRP recently issued an All-Source RFP that will consider all generation resource types for additional power needs beyond the CEP in the 2024 – 2026 timeframe.

- 5. SRP has stated it intends to run the Project in a limited capacity to meet system peaks. Is SRP prepared to place a limitation on the total allowable capacity factor for this Project, such as at no greater than 10%?**

The Coolidge Generating Station will be operated as a peaking facility, and as such, will run for a limited number of hours to help meet SRP’s peak demand at the hottest times of the year or when needed to smooth out the variability of renewable resources. The CEP could however also be called upon in unexpected longer duration events such as outages of other units or long-term weather events. There may be times during strained conditions that the CEP may be called upon and in which its operation might be critical to preserving the reliability of the electric system. As a result, from a reliability



perspective, SRP is concerned about having a “hard cap” capacity factor limit that would preclude it from operating the CEP as a critical reliability resource.

As outlined in the Western Electricity Coordinating Council (WECC) resource adequacy report,<sup>3</sup> the Desert Southwest is facing serious resource adequacy challenges and is at risk of experiencing unserved load primarily driven by increasing levels of variable resources. A capacity factor limitation could force grid operators to take the CEP units offline during system peaks, which could create reliability risk for the customers and communities we serve.

Coolidge is a peaking facility and when considering dispatch cost, SRP would not have an incentive to run the Coolidge units any more than necessary to maintain reliability or as a resource to keep costs low for its customers. In addition, the air quality permit has emission limits that preclude the CEP from operating at high-capacity factors. Therefore, SRP does not believe a capacity factor limitation is necessary or appropriate.

**6. In the event SRP does not agree to the above capacity factor limitation, is it fair to assume SRP would consider running this facility in scenarios outside of system peaks, such as within the Energy Imbalance Market?**

SRP will likely run this facility outside of system peaks. SRP needs the CEP to support our overall system reliability. As explained in the response to Question #5, SRP may need to call upon the CEP units during unexpected longer duration events such as outages of other units or long-term weather events. In addition, with higher levels of renewable energy on the grid in the future, SRP may need to call upon the CEP units to help provide backup for variability. It is difficult to predict how much variability SRP will see with much higher renewable penetrations in the future.

SRP plans and builds power generation resources like the CEP to meet SRP customer demand for electricity and reliability needs first and foremost. SRP may look to sell excess energy into markets, such as the CAISO’s Energy Imbalance Market (EIM) or others, but only power output beyond what is needed to serve our customers. As a community-based not-for-profit public utility, the sale of energy helps SRP offset costs and maintain affordable electric prices for our customers.

During the 2017 – 2018 Integrated Resource Plan process, a robust group of stakeholders provided input and guidance on elements that formed the Strategic Resource Directions approved by SRP’s Board of Directors on January 8, 2018. The strategic resource directions, listed below, have since guided SRP’s resource decisions:

- |   |   |
|---|---|
| • Grow Renewables                       | • Seek battery alternatives   |
| • Reduce Coal                           | • Develop flexible natural gas  |
| • Preserve option for new nuclear       | • Expand participation in regional transmission markets   |
| • Develop and promote customer programs | • Focus research on new technologies for generation, load management, storage and electrification |

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<sup>3</sup> <https://www.wecc.org/Administrative/Western%20Assessment%20of%20Resource%20Adequacy%20Report%2020201218.pdf>



Just as adding flexible peaking gas resources was part of SRP's 2018 Integrated Resource Plan strategic directions, so too was evaluating expanding regional markets. As a result, SRP became a member of the CAISO EIM in 2020 and we continue to evaluate additional market expansions that would result in greater reliability and cost savings for our customers. The EIM leverages geographically and technologically diverse generation resources to serve the loads of all participating members more efficiently. According to CAISO's most recent report,<sup>4</sup> SRP has realized over \$71M in total overall benefits from our participation in this regional market. Cost savings realized as a result of our participation in EIM are passed onto customers, further lowering customers' overall monthly energy bills. Just as with the existing units at Coolidge Generation Station, we anticipate that the CEP will also be dispatched as part of EIM in such a manner as to bring efficiencies to the overall system, with those efficiencies resulting in benefits to our customers.

SRP does not expect to dispatch the CEP at high-capacity factors because of market participation. The air quality permit will have emission limits that preclude the CEP from operating at high-capacity factors.

**7. Please detail all opportunities SRP provided for public input and involvement prior to the vote by its District Board of Directors on the Project, including dates.**

SRP recognizes that resource choices have meaningful long-term impacts on customers and many stakeholders. SRP's 2017 – 2018 Integrated Resource Plan process relied on key analytics as well as extensive collaboration with stakeholders and SRP's elected officials. SRP held more than 20 discussions with SRP's elected officials and five in-depth stakeholder meetings to engage with stakeholders:

- January 31, 2017 – Initial Stakeholder Input Meeting
- June 16, 2017 – Stakeholder Meeting 1
- August 23, 2017 – Stakeholder Meeting 2
- October 20, 2017 – Strategic Initiatives Advisory Panel Meeting<sup>5</sup>
- October 26, 2017 – Stakeholder Meeting 3

This process was informed by and responsive to customer, stakeholder and elected official perspectives.

The objective of SRP's resource portfolio has always been to deliver reliable, affordable and sustainable power to our customers. Portfolio development follows a disciplined analytical process that incorporates: SRP Board Policy, Sustainability Goals, customer needs and preferences, regulations, technology, and customer cost. The overall objective of the IRP process was to incorporate a flexible resource plan that can embrace the challenges, uncertainties and growing energy requirements of tomorrow's world.

The outcome of the IRP process was eight strategic resource directions that are the guiding principles for SRP's resource decisions that are listed in the response to Question #6. To date, SRP has made substantial commitments on each of those resource directions<sup>6</sup> with limited development of flexible

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<sup>4</sup> <https://www.westernem.com/Pages/About/QuarterlyBenefits.aspx>

<sup>5</sup> SRP also offered two alternate dates on October 23, 2017, and October 30, 2017.

<sup>6</sup> SRP reported progress on these resource directions to stakeholders June 16, 2021. The presentation is posted publicly: <https://srpnet.com/about/pdfx/ISP-Meeting-1-Presentation.pdf>



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natural gas. SRP has been able to delay adding additional gas generation until recently, but load growth and the need for near term capacity require SRP to add flexible firm resources to maintain reliability and continue integrating renewables.

The second important stakeholder process that SRP has undertaken was the process surrounding the establishment of SRP's 2035 Sustainability Goals. The Board-established SRP sustainability goals, which are a major driver for SRP resource decisions, were also developed with a robust stakeholder process. The current SRP sustainability goals approved by the SRP Board of Directors on June 3, 2019, was the result of a five-month inclusive process with more than 60 community stakeholders<sup>7</sup> and customers to gain input, recommendations and support. The Phase 1 Stakeholder Workshop held on November 14, 2018, included broad group of stakeholders representing a wide range of customer, community and advocacy groups to hear feedback about the goals and their direction. SRP invited 114 stakeholders and 60 attended.<sup>8</sup> During the next phase, SRP met with a smaller, representative group of stakeholders to engage in deeper dialogue about the goals.<sup>9</sup> SRP held five Phase 2 meetings:

- January 25, 2019 – Water Goals
- February 8, 2019 – Community & Operations Goals
- March 1, 2018 – Grid Modernization; Fleet & Facilities Carbon
- March 8, 2018 – Carbon Goals
- March 25, 2019 – Exploration of New Goals, Selected Goal Revisit & Wrap-Up

In addition, SRP also opened a public comment process to solicit comments from its customers in December 2018 through early 2019 to solicit feedback from customers and generated more than 4,000 comments. We received many favorable comments on the stakeholder process and the establishment of our overall goals.

SRP announced the CEP in August 2021 as part of its 2021 Summer Stakeholder Series.<sup>10</sup> The Summer Series included four meetings and took place from June through August 2021:

- June 16, 2021 Since We Last Met: Update on 2017-2018 IRP Strategic Resource Directions
- July 22, 2021 Near Term Planning
- August 16, 2021 Where We Want to Go “Long-Term”
- August 23, 2021 Near-Term Planning Part 2

The meetings were attended by 107 stakeholders. These stakeholders included a diverse mix of individuals representing different groups and industries such as SRP customers, government and municipalities, economic and leadership development organizations, academia and more. Through presentations and subsequent breakout discussions, attendees shared their thoughts about the near-term

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<sup>7</sup> [https://www.srpnet.com/environment/sustainability/pdfx/SRP2035\\_Community-Stakeholder-Engagement-Summary-Report.pdf](https://www.srpnet.com/environment/sustainability/pdfx/SRP2035_Community-Stakeholder-Engagement-Summary-Report.pdf)

<sup>8</sup> See Appendix 3 of the SRP 2035 Community Stakeholder Engagement Summary Report pp. 34 for a list of attendees. - [https://www.srpnet.com/environment/sustainability/pdfx/SRP2035\\_Community-Stakeholder-Engagement-Summary-Report.pdf](https://www.srpnet.com/environment/sustainability/pdfx/SRP2035_Community-Stakeholder-Engagement-Summary-Report.pdf) -

<sup>9</sup> See Appendix 4 of the SRP 2035 Community Stakeholder Engagement Summary Report pp. 35 for a list of attendees. - [https://www.srpnet.com/environment/sustainability/pdfx/SRP2035\\_Community-Stakeholder-Engagement-Summary-Report.pdf](https://www.srpnet.com/environment/sustainability/pdfx/SRP2035_Community-Stakeholder-Engagement-Summary-Report.pdf)

<sup>10</sup> <https://srpnet.com/about/integrated-system-plan.aspx>



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approach and how it may impact customers and communities as well as how it addresses topics like growth and climate change. Feedback highlighted a shared commitment to implementing diverse sustainability tactics while staying focused on power reliability and water conservation.

SRP also held multiple meetings and informal discussions with interested stakeholders to discuss the CEP in more detail.

During public meetings held on August 24, 2021 and September 13, 2021, the District's publicly elected Board of Directors considered and approved the Coolidge Expansion Project. The SRP Board meeting was a public meeting with 57 interested parties in attendance and the opportunity for the public to comment on the proposal. At the meeting, 24 individuals made a statement during public comments.

**8. To your knowledge, what other new natural gas-fired power plants (not including those previously approved by SRP's District Board of Directors) are currently proposed in the State of Arizona?**

The CEP is an expansion of an existing power plant site, not a new-build generation resource at a greenfield site. We are not aware of any other current proposals for natural gas-fired power plants in Arizona. The most recently completed natural gas-fired power plants in Arizona are TEP's Sundt Generating Station modernization (2020) and APS's Ocotillo Power Plant modernization (2019). These plants' operating characteristics and the reasons for their construction are very similar to that of the CEP. In the case of TEP's Sundt Generating Station, the application noted they were needed to "greatly enhance the reliability of the electric grid and support TEP's expanded use of renewable resources." Similarly, APS stated in their Ocotillo application that "the Project will help APS integrate renewable energy and meet increasing customer demand."

**9. Would any alternative natural gas peaker technology provide greater ability for future conversion to "green hydrogen capability" as compared to the "aeroderivative" gas turbines SRP currently proposes for this Project?**

The GE LM6000 combustion turbine is capable of burning a hydrogen blend of about 30% and GE has product development plans to increase the hydrogen capability eventually supporting operation on 100% hydrogen. The current capability of this plant is consistent among most combustion turbine manufacturers and the ability to burn 100% hydrogen is not expected to be a practical option for at least a decade due to the lack of available infrastructure to produce, store and distribute zero carbon hydrogen. SRP selected the GE LM6000 technology based on a number of factors that best meet our needs and the technology offers the option for burning hydrogen in the future as it becomes available and cost effective.

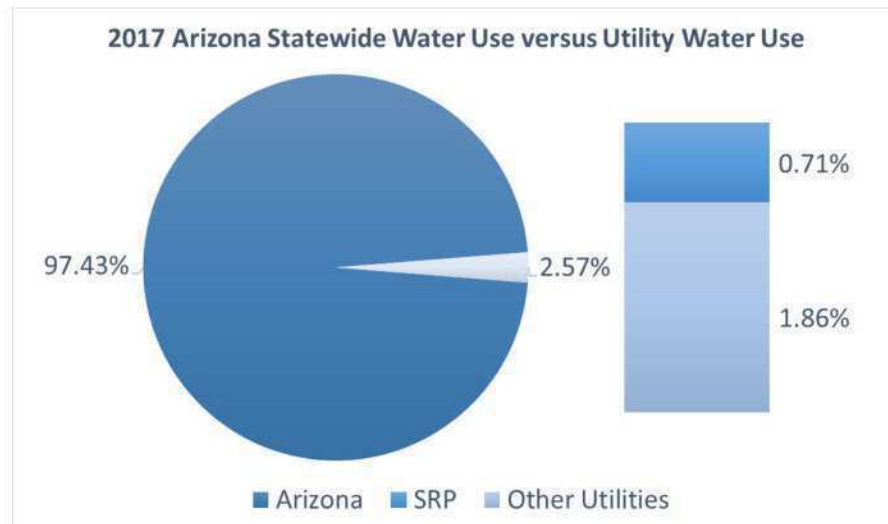
**10. Would any alternative natural gas peaker technology require less water during operations compared to the "aeroderivative" gas turbines SRP currently proposes for this Project?**

SRP carefully considered and weighed a number of factors, including water use, in the selection of the turbine technology for the CEP. As described in the response to Question #3, based on a balance of all the factors considered, SRP determined that the LM6000 turbines best meet SRP's needs.

The CEP generation method is a simple cycle, which does not rely on steam to produce power, so it uses significantly less water than other types of generation, such as a combined cycle natural gas power plant. As part of our Board-established 2035 goals, SRP is committed to reducing water use at SRP facilities and eliminating or offsetting power generation groundwater use in Active Management Areas (AMAs).

After completion of the expansion, SRP will discontinue the use of groundwater and will rely exclusively on stored Central Arizona Project (CAP) water to serve the Coolidge Generating Station. SRP has already stored sufficient water in the Pinal County AMA to support an expanded Coolidge Generating Station for more than 60 years.

To put the CEP water use in context, the statewide water use in 2017 was about 7 million acre-feet. SRP projects the Coolidge Generating Station to use about 450 acre-feet after expansion. This represents less than 1/100<sup>th</sup> of 1% of total water use in the Arizona.



In summary, the technology used for the CEP will utilize significantly less water than other types of generation, and after completion of the expansion, Coolidge will rely exclusively on stored surface water, which will have minimal impact on water supply overall.

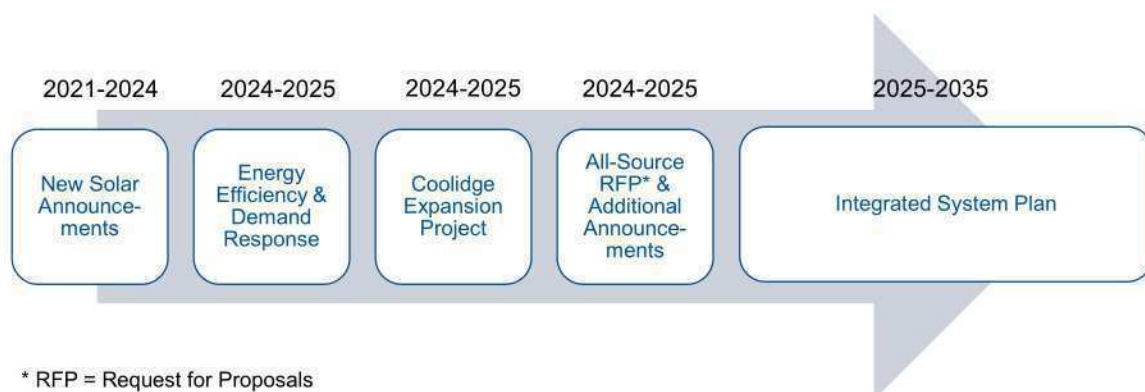


## Attachment B



1

## Addressing Near-Term Needs – “AND” Strategy

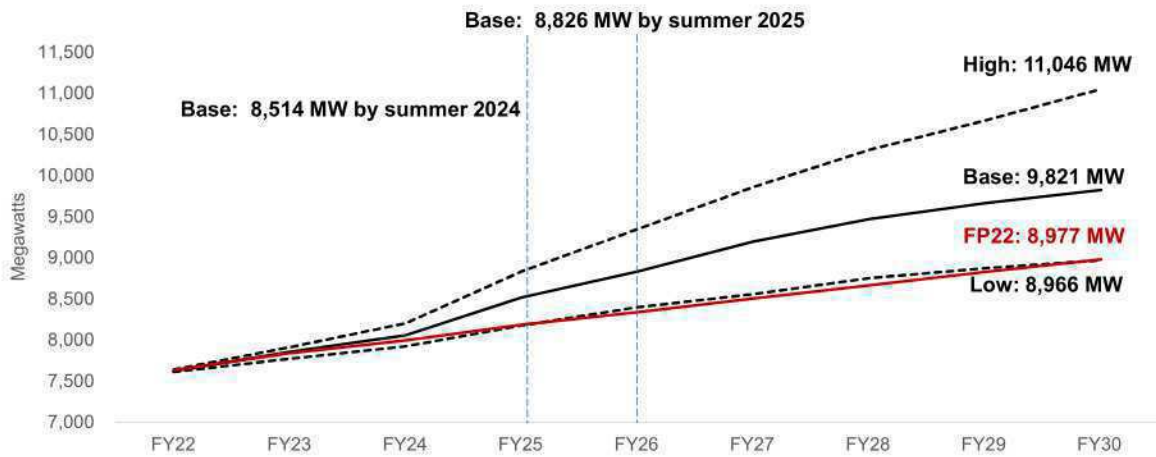


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## Significant Near-Term Growth

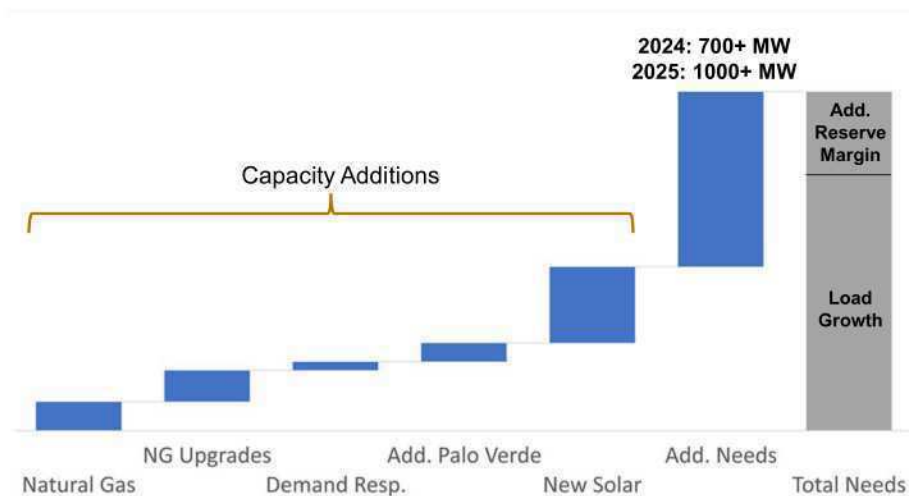


**Key Takeaway:** ~900 MW of new load expected by 2024, ~1,200 MW 2025

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## Near-Term Resource Additions and Needs



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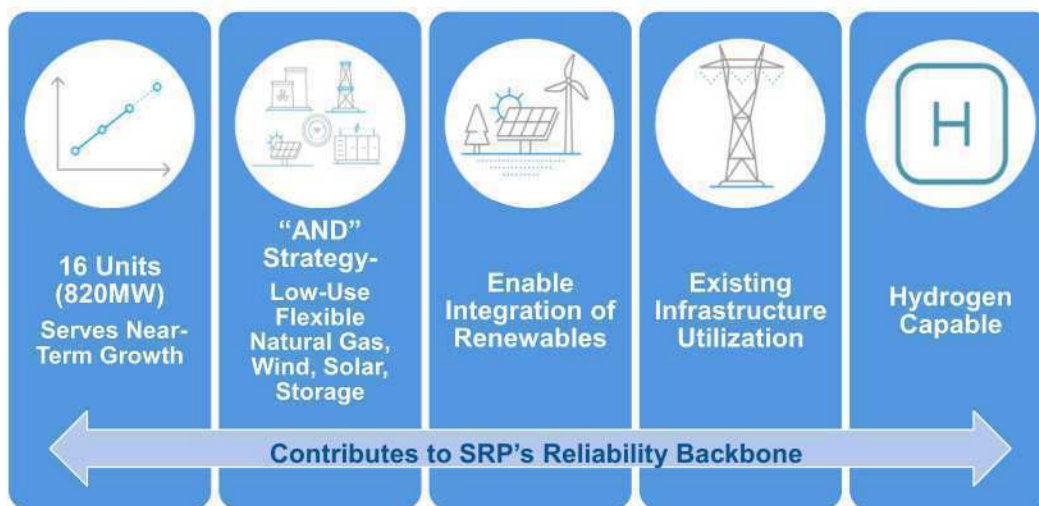
## Considerations for Near-Term Capacity Additions



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## Recommendation – Coolidge Expansion

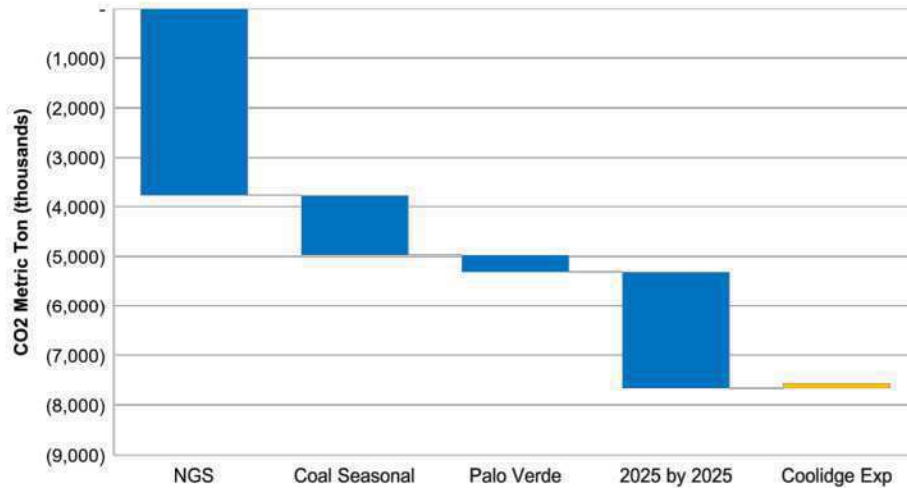


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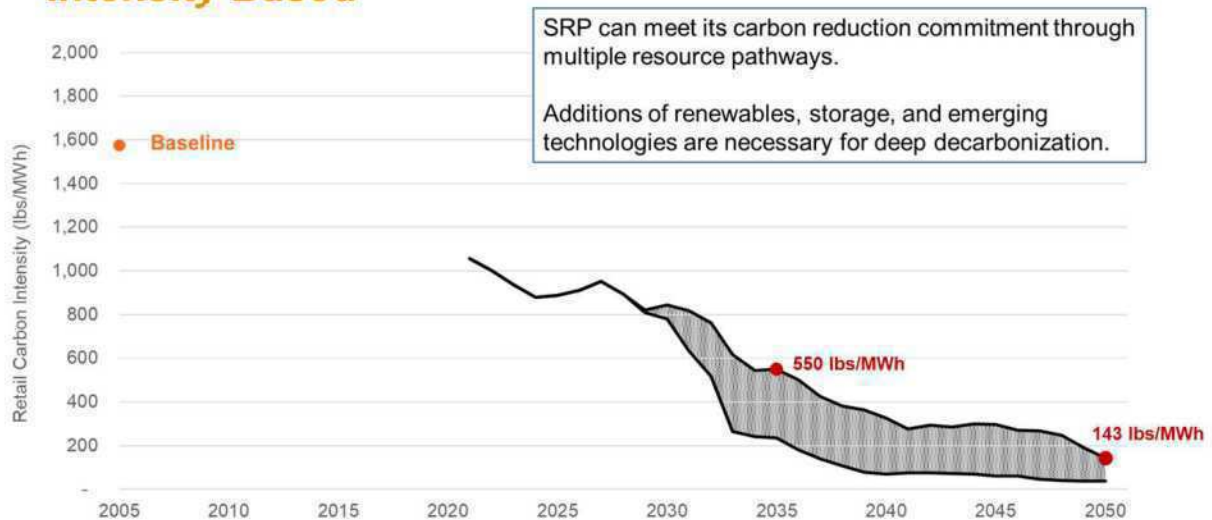
## CO<sub>2</sub> Emission Comparison



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## SRP Carbon Commitment Intensity Based



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## Why not add more Battery Storage instead?

- Adding ~400 MW by 2023
- Lack of operational experience
- No long-term performance data
- Limited discharge duration
- Supply chain risks (2024 need)



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## Economic Comparison

- Coolidge portfolio is the least cost option under all scenarios
- Coolidge expansion breaks even in the 2030s in all scenarios
- All scenarios meet SRP carbon commitments
- 3-4 times the carbon free capacity needed to provide similar reliability

Scenario	Coolidge vs. Zero-Carbon Portfolio
	Net Present Value
Low Gas Prices	+ \$872 million
Base Gas Prices	+ \$637 million
High Gas Prices	+ \$407 million
Low Battery Costs	+ \$342 million

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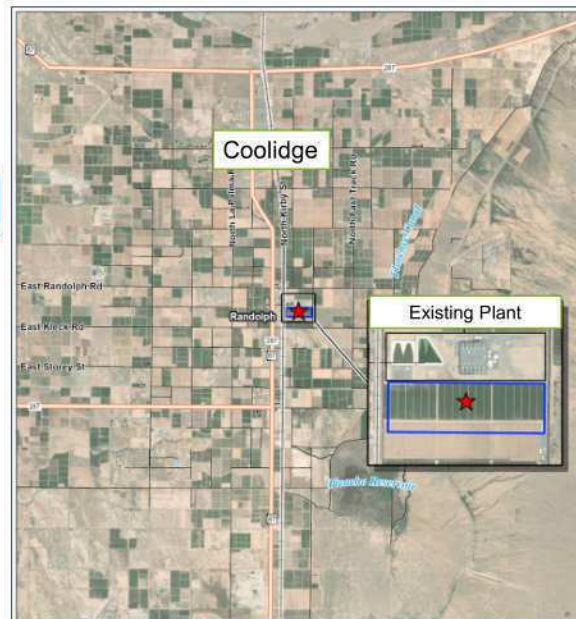


## Existing Coolidge Facility

### Natural Gas Fired – Simple Cycle

- 12 aeroderivative gas turbines (GE LM6000)
- 615 MW nameplate capacity
- Built in 2008 by TransCanada
- Purchased by SRP in 2019
- Best available emission controls

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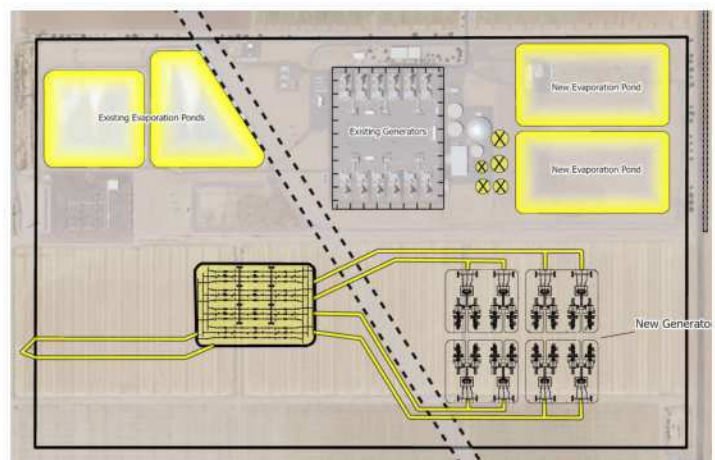
## Coolidge Expansion

### Expansion Scope

- 16 additional aero. gas turbines
- 8 in 2024, 8 in 2025
- 820 MW nameplate capacity
- Best available emission controls
- 500 kV switchyard

### Leverage Existing Infrastructure

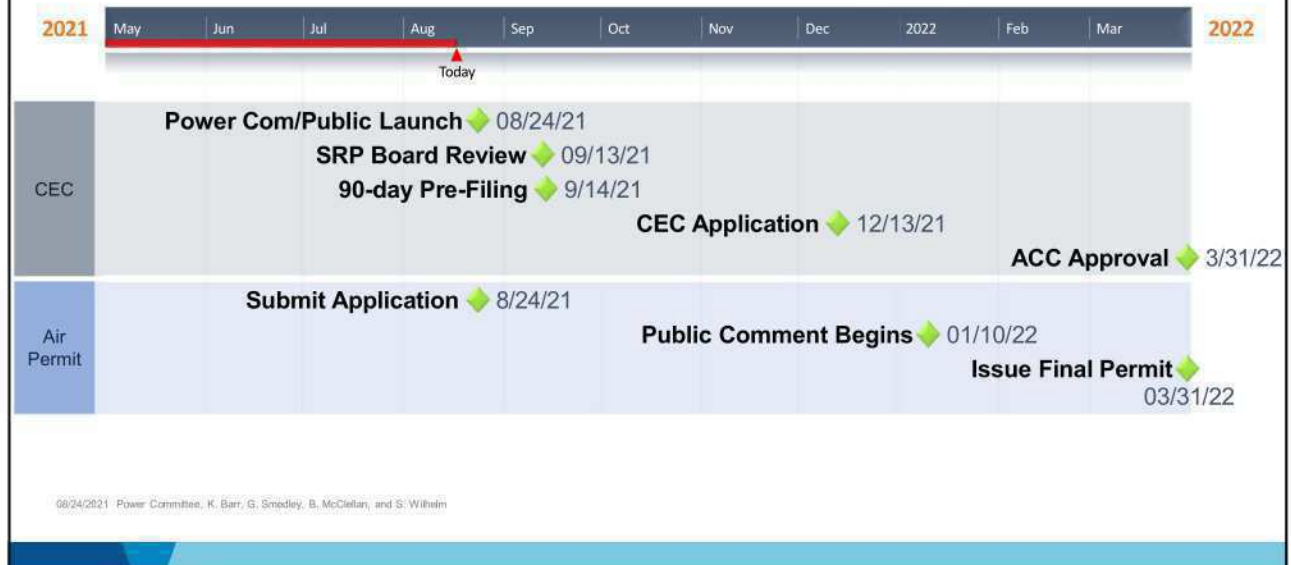
- Two natural gas pipelines
- Sufficient water supply
- 500 kV and 230 kV transmission



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## Siting and Permitting Schedule



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## Opportunities for Public Involvement



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## Proposed Construction Schedule (Accelerated)



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## Planned Expenditures

### Capital Expenditures (in millions)

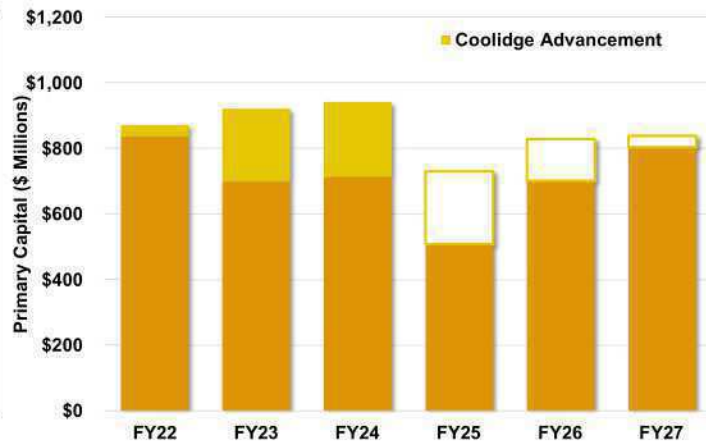
	FY22	FY23	FY24	FY25	Total
Capital	\$37	\$261	\$464	\$68	\$830

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## Coolidge Advancement vs. FP22

- Capital spending for Coolidge reflects most recent estimate; cash outflows advanced to earlier years
- Existing liquidity sufficient to cover budget year expenses
- Management will share broader financing plan at October Board/Council Work Study Session
  - Plan includes:
    - Commercial Paper
    - Revenue Bonds



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## Request for Approval

Management requests that the Power Committee recommend that the Board authorize the Associate General Manager and Chief Power System Executive, President, Vice-President, or General Manager and Chief Executive Officer to:

- execute agreements for the purchase of 16 GE LM6000 gas turbines and associated equipment and for the installation thereof including any necessary balance of plant modifications and transmission system upgrades for a total cost not to exceed \$953 million;
- obtain any necessary permits or modifications to existing permits for the installation and use of such equipment; and
- execute any subsequent amendments to such agreements that do not materially modify the terms of the agreements.

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## Attachment C





1

## Strategic Resource Directions



Grow renewables



Reduce coal



Preserve option for new nuclear



Develop and promote  
customer programs



Seek battery alternatives



Develop flexible natural gas



Expand participation in regional  
transmission markets



Focus research on new  
technologies for generation, load  
management, storage and  
electrification

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## SRP 2035 Sustainability Goals



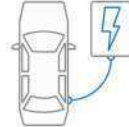
**Carbon  
Footprint**



**Water  
Resiliency**



**Supply Chain &  
Waste Reduction**



**Customer &  
Grid Enablement**



**Customer,  
Community &  
Employee  
Engagement**

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## SRP's System Planning Vision (2025 – 2035)



### The ISP identifies:

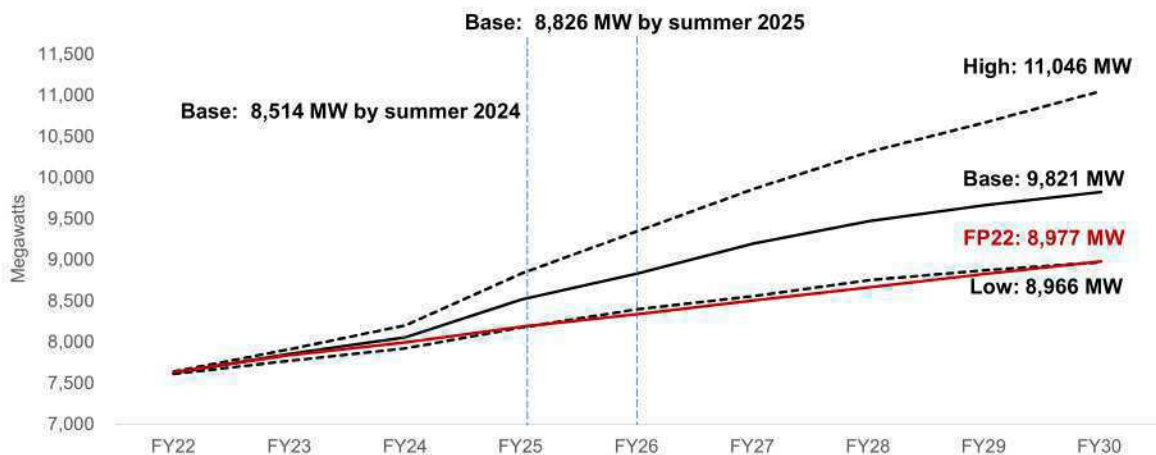
- Viable pathways for achieving SRP's 2035 Corporate Goals
- Costs, risks and tradeoffs of the different pathways
- System solutions valuable across different pathways
- Needed new capabilities or tools

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## Significant Near-Term Growth



Key Takeaway: ~900 MW of new load expected by 2024, ~1,200 MW 2025

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## WECC Assessment of Resource Adequacy

Under the most **optimistic assumptions** about future loads, resources, and imports...the **Desert Southwest** and Northwest Power Pool-Central subregions, and the southern California portion of the California and Mexico subregion are **most at risk of experiencing unserved load**.

Historical approaches to resource planning, if unchanged, will result in a significant degradation of resource adequacy.

~WECC Assessment of Resource Adequacy Report, Dec. 18, 2020

- Risk driven by baseload retirements and variable resource additions
- Desert Southwest needs external assistance to maintain reliability
- Additional resources need to be added over the next four years

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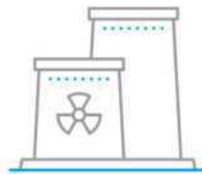
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## Meeting Near-Term Growth with “AND”

Serving SRP’s growing customer demand reliably will require resource additions.

We have a good foundation:



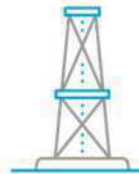
Palo Verde Nuclear  
+114 MW by 2024



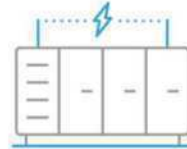
Solar Additions  
+2025 MW by 2025



Demand Response  
150 MW by 2022



Near-term Peakers  
+176 MW by 2022



Battery Storage  
+372 MW by 2023

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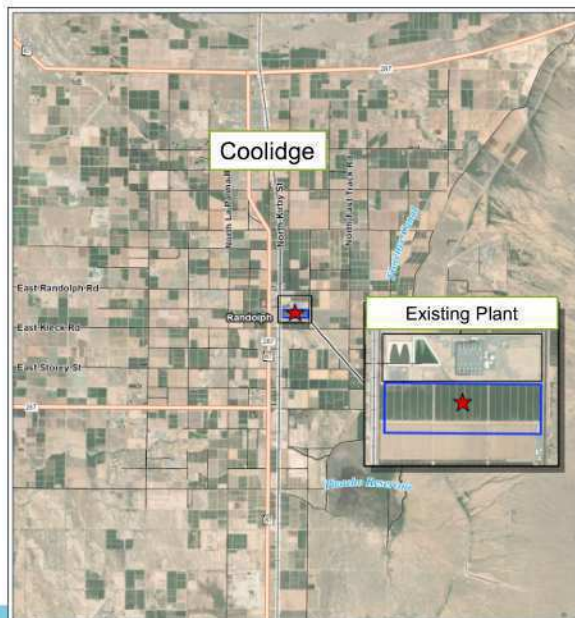
## Recommendation - Coolidge Expansion

### Expansion Scope

- 16 additional aero. gas turbines
- 8 in 2024, 8 in 2025
- 820 MW nameplate capacity
- GE LM6000
- Best available emission controls
- 500 kV switchyard
- Planned expenditures \$830 million, not to exceed \$953 million

### Leverage Existing Infrastructure

- Two natural gas pipelines
- 500 kV transmission
- Sufficient water supply



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## Basis of Recommendation



### Reliability

- Serves near-term growth
- Quick start, fast ramping
- Mature technology



### Sustainability

- Low utilization
- Enables more renewables
- Hydrogen capable
- Low water use



### Affordability

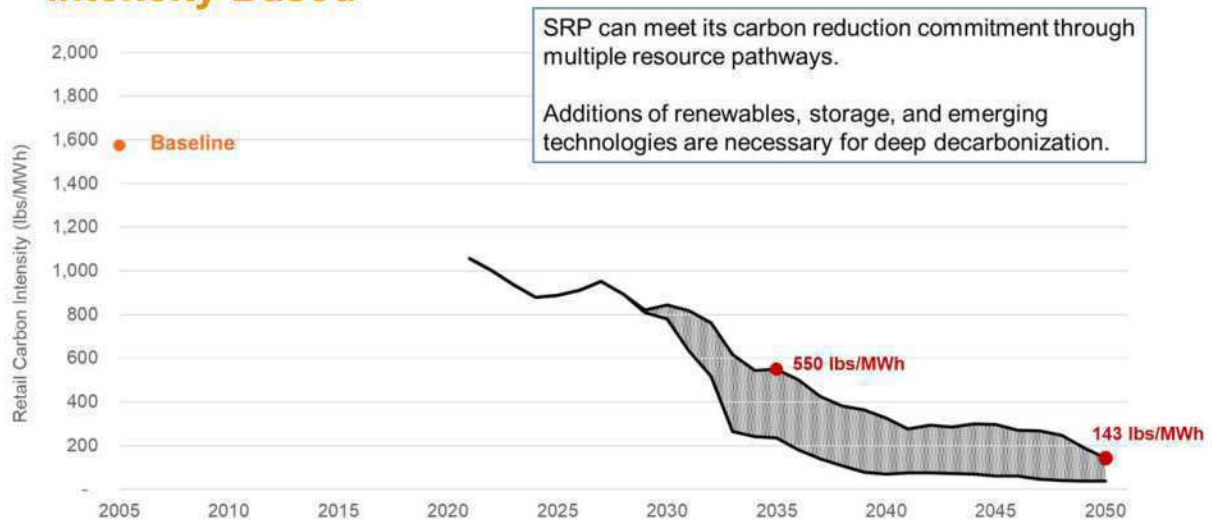
- Best value for SRP customers

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## SRP Carbon Commitment Intensity Based



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## Alternatives – Why not add more Battery Storage?

- Adding ~400 MW by 2023
- Lack of operational experience
- No long-term performance data
- Limited discharge duration
- Supply chain risks (2024 need)



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## Affordability - Economic Comparison

### Approach:

1. Performed reliability simulations:
  - Coolidge Portfolio
  - Zero-Carbon Portfolio
  - E3 Zero-Carbon Portfolio
2. Performed economic comparison
3. Explored sensitivities (gas prices, battery costs)

### Results:

- 3-4 times the carbon free capacity needed to provide similar reliability
- Coolidge portfolio is the least cost option under all scenarios
- Coolidge expansion breaks even in the 2030s in all scenarios

Scenario	Coolidge vs. Zero-Carbon Portfolio
	Net Present Value
Low Gas Prices	+ \$872 million
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Low Battery Costs	+ \$342 million

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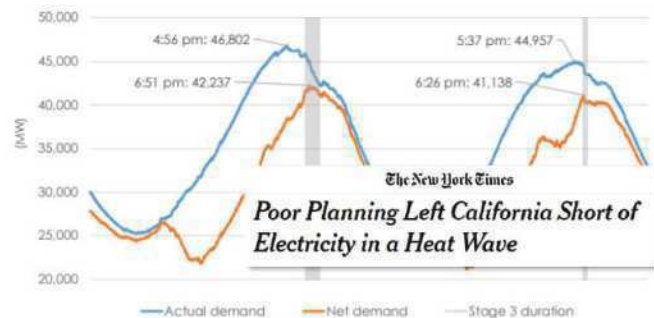
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## Planning for Reliability

- Ample supply available to meet demand
- All conditions – not just average
- Firm resources with sustained output have the highest reliability value



Source: <http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf>

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## Summary of Recommendation – Coolidge Expansion

- Critical to reliably serving near-term growth
- Enables integration of additional renewable energy
- Most affordable option that provides greatest value to SRP customers

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## Attachment D

January 14, 2021

# **SALT RIVER PROJECT**

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## **Coolidge Plant Expansion** *Technology Selection Review*

**PROJECT NUMBER:**  
168705

**PROJECT CONTACT:**  
STEVE HARRIS  
**EMAIL:**  
STEVE.HARRIS@POWERENG.COM  
**PHONE:**  
(208) 288-6408





## *Technology Selection Review*

**PREPARED FOR:** SALT RIVER PROJECT

**PREPARED BY:** STEVE HARRIS

(208) 288-6408

STEVE.HARRIS@POWERENG.COM

REVISION HISTORY		
DATE	REVISED BY	REVISION
Jan 14, 2021	D. Compton	A

## INTRODUCTION

POWER Engineers was engaged by Salt River Project (SRP) to perform an independent analysis of the power generation technology selection process for the Coolidge Expansion Project. The expansion project is driven by future capacity needs and integration of intermittent renewable power generation technologies. The expansion capacity is between 500-860 MW and the technology was must be able to ramp to full load within 10 minutes.

The evaluation performed by SRP weighted criteria in four categories; flexibility, sustainability, experience and reliability, and cost. The evaluation included frame, aeroderivative and reciprocating engine technologies.

The review process performed by SRP ultimately concluded that the GE LM6000 was the most appropriate technology for the Coolidge Expansion Project. This selection is valid, given the projects need to balance overall plant capacity with the flexibility required to manage a grid with intermittent resources, as well as familiarity with the technology.

## CRITERIA

The criteria selected by SRP to evaluate asset technology for the future expansion are standard for assessments of this nature and would be used by POWER when performing similar evaluations. With this being said, there are two additional criteria that were not discussed in the technology selection matrix which could provide valuable insight. While the operation and maintenance costs were factored into the assessment, it may be beneficial to include the cost of water and factor this into a life cycle cost. Additionally, overall system redundancy was not directly assessed. Given the substantial variance in MW output between the various technologies, redundancy of the overall plant would be a useful metric for the expansion. These additional metrics will be discussed in later portions of the report.

### Flexibility

To assess the flexibility of the future expansion, time to full load, ramp rate, and maximum annual capacity factor were compared. These factors provide an accurate assessment of the individual technologies ability to maintain grid stability with intermittent generation. The factor most heavily weighted by SRP in this category was time to full load. Based upon the presentation provided by SRP, the asset must be able to reach full load within ten minutes to manage intermittent generation resources. Aeroderivative and reciprocating engine technologies are able to meet this requirement, but the frame technologies in consideration would not be able to meet this requirement.

### Sustainability

Sustainability has been evaluated based primarily on the technology emissions and water usage, with hydrogen capabilities being a consideration as well. Particulate emissions (PM10) were most heavily weighted followed by the technology water usage. Based upon the discussions held with SRP, PM10 emissions were more heavily weighted due to permitting difficulties with PM10 emissions. This factor will favor gas turbine technology over reciprocating engine technology due to the fact that PM10 emissions from reciprocating engines are generally higher than gas turbine technology. While other emission factors are important, all machines would require an SCR/CO catalyst, thus the emissions from CO and NOx would be fairly similar and not directly impact the selection process.

Water usage is evaluated based on a Gal/MWH rating, but information has not been provided to validate these water consumption numbers. As expected, the frame machines would require less water than the aeroderivative technologies because the water would only be used for power augmentation. Depending on the combustor technology chosen, the aeroderivative technologies may require water for emissions controls as well as power augmentation. Although power augmentation may not be required in all operating scenarios, the water used for evaporative cooling is an important consideration.

Although the use of hydrogen as fuel is still in its infancy, it is an important consideration as the markets push for carbon free generation. Although hydrogen capability was not the most important consideration in this category, it was appropriately weighted to balance the infancy of its use with the push to carbon free power generation over the life cycle of the proposed expansion. Based on the ranking in the technology selection matrix, SRP considered SAC combustor technology when ranking the aeroderivative hydrogen capability. As of now, SAC combustor technology can accommodate a higher percentage of hydrogen than the DLE combustion technology, 30% versus 5%. This is an important consideration when evaluating the LM 6000 model selection.

## **Experience and Reliability**

There can be a significant learning curve in operating and maintaining new technologies which can invite unpredictable maintenance and operating costs. Familiarity with the operation and maintenance of the technologies has been weighed appropriately high in the assessment. Given that the current Coolidge site assets are GE LM6000 machines, this criterion would favor gas turbine technologies, specifically the GE LM6000.

The technology selection presentation discussed the overall plant redundancy and the impact that a failure of an asset may cause to the grid, however, this criterion was not placed into the selection matrix. This factor should have a considerable weight in the selection process to ensure system stability. The effect of a 425 MW asset tripping vs a 50 MW asset tripping should be evaluated to ensure the system could accommodate a large asset dropping off-line. Although the risk may be low based on a 10% capacity factor, this criterion would appear to favor multiple aeroderivative machines.

## **Cost**

The evaluation conducted by SRP included a comparison of capital cost, fuel cost, and maintenance costs for a single year. Capital costs will vary based on the source of the information, and while POWER can't verify the accuracy of these costs without additional work, the capital cost data is within the industry standards typically used at this point in the project development process. As would be anticipated, frame machines have a lower cost per MW than aeroderivative technologies. It should be noted SRP is likely to receive a discounted cost for the gas turbines depending on the quantity. In discussions with GE, the discount would depend on the specific model selected as well as the required delivery schedule. Being dependent on these factors, a discount of 3% could be estimated.

The evaluation compared individual frame gas turbines with plants composed of multiple aeroderivative or reciprocating engines which makes it difficult to compare overall fuel and water costs. In an effort to accurately assess plant costs, the below analysis compares the life cycle costs of plants with a minimum rating of 700 MW. Per the technology review presentation this capacity is sufficient to support variation in output of 1,700 MW of solar generation. Table 1 details the plant



configuration assessed. A plant comprised of the GE 7H.03, MHI 501G, and the MHI 501J exceeds the 700 MW plant minimum by a substantial margin so for an equal comparison the values are based on the gas turbines operating at part load to achieve the desired 700 MW capacity. The GE LM6000 rating is based upon the net output of the PF model, which is a DLE machine.

TABLE 1: ASSESSED PLANT CONFIGURATIONS							
	GE 7F.05	GE 7H.03	MHI 501G	MHI 501J	GE LMS100	GE LM6000	WARTSILA
NAMEPLATE RATING (MW)	243	430	283	425	117	44	18.7
NUMBER OF UNITS (QTY)	3	2	3	2	6	16	38
PLANT CAPACITY (MW)	729	860	849	850	702	704	710.6

Plant life cycle costs were prepared using the constants in Table 2. The cost of capital and the initial fuel cost are based upon SRP provided data. The other criteria presented is based off of experience on previous projects. The capacity factor is assumed to be a constant at 10%, however, in operation the capacity will vary from machine to machine based upon the emission limits.

TABLE 2: LIFE CYCLE COST CRITERIA	
COST OF CAPITAL	6%
PLANT LIFE	30 YEARS
CAPACITY FACTOR	10% (876 HOURS)
FUEL COST	2.00 \$/MMBTU
FUEL ESCALATION	4.1%
WATER COST	1.22 \$/ mGAL
WATER ESCALATION	1%

Table 3 provides an estimate of the life cycle fuel costs. The part load heat rate for the GE 7H.03, MHI 501G, and the MHI 501J was used to calculate the annual fuel usage.

TABLE 3: LIFE CYCLE FUEL COST COMPARISON							
	GE 7F.05	GE 7H.03	MHI 501G	MHI 501J	GE LMS100	GE LM6000	WARTSILA
FULL LOAD HEAT RATE (HHV, BTU/KWH)	10,453	9,153	9,888	8,988	8,945	9,598	8,399
PART LOAD HEAT RATE	N/A	9,469	10,382	9,299	N/A	N/A	N/A
ANNUAL FUEL GAS USAGE (MMBTU/YR)	6,675,442	5,806,431	6,366,536	5,702,023	5,500,928	5,885,386	5,228,256
FUEL COST YEAR ONE	\$13,350,884	\$11,612,862	\$12,733,073	\$11,404,046	\$11,001,858	\$11,838,033	\$10,456,513
LIFE CYCLE FUEL COST	\$761,415,059	\$662,293,830	\$726,180,595	\$650,384,786	\$627,447,550	\$675,135,563	\$596,345,978

Table 4 provides an estimate of the life cycle water costs associated with the different plant configurations. As discussed in the previous section, the provided water usage for the individual gas turbines could not be validated. Although the water usage for evaporative cooling on the frame machines may not be required at all operating conditions, it is assumed to be operating 100 percent of the time in the below analysis.

**TABLE 4: LIFE CYCLE WATER COST COMPARISON**

	GE 7F.05	GE 7H.03	MHI 501G	MHI 501J	GE LMS100	GE LM6000	WARTSILA
WATER USAGE (GAL/MWH)*	163	115	160	117	353	178	0.04
ANNUAL WATER USAGE (mGAL /YR)	104,092	70,518	98,112	71,744	217,078	109,150	25
WATER COST YEAR ONE	\$126,992	\$86,031	\$119,696	\$106,284	\$264,835	\$133,162	\$30.38
LIFE CYCLE WATER COST	\$4,417,430	\$3,376,638	\$5,049,894	\$3,697,084	\$9,212,264	\$4,632,043	\$1,056

Table 5 provides an estimate of the life cycle maintenance costs. The numbers provided by SRP were used in the calculation, however, it should be noted that the numbers indicated for MHI machines are lower than anticipated. The calculated maintenance costs for the GE 7H.03, MHI 501G, and the MHI 501J are based upon the rated capacity rather than 700 MW, because the overall maintenance cost is likely to remain the same or be higher when operating partially loaded.

**TABLE 5: LIFE CYCLE MAINTENANCE COMPARISON**

	GE 7F.05	GE 7H.03	MHI 501G	MHI 501J	GE LMS100	GE LM6000	WARTSILA
VARIABLE AND FIXED MAINTENANCE (\$/MWH)	\$16.41	\$17.33	\$11.00	\$9.71	\$15.29	\$19.25	\$19.13
YEARLY MAINTENANCE COST	\$10,479,491	\$13,055,728	\$8,180,964	\$7,230,066	\$9,402,616	\$11,871,552	\$11,908,149
LIFE CYCLE MAINTENANCE COST	\$314,384,749	\$391,671,864	\$245,428,920	\$216,901,980	\$282,078,482	\$356,146,560	\$357,244,484

Table 5 provides a summary of the life cycle operating and maintenance cost for each plant configuration. The total life cycle cost presented below does not include the cost of capital, thus does not represent the net present value of the project.

**TABLE 5: LIFE CYCLE COST COMPARISON**

	GE 7F.05	GE 7H.03	MHI 501G	MHI 501J	GE LMS100	GE LM6000	WARTSILA
CAPITAL COST (\$/KW)	\$669.00	\$700.00	\$704.00	\$594.00	\$1,040	\$958	\$965
CAPITAL COST PER YEAR (\$/KW-YR)	\$48.65	\$50.91	\$51.20	\$43.20	\$75.64	\$69.67	\$70.18
LIFE CYCLE CAPITAL COST (MM \$)	\$1,064	\$1,313	\$1,304	\$1,101	\$1,592	\$1,471	\$1,496
LIFE CYCLE FUEL COST (MM \$)	\$761.41	\$662.29	\$726.18	\$650.38	\$627.44	\$675.13	\$596.34
LIFE CYCLE WATER COST (MM \$)	\$4.417	\$3.376	\$5.059	\$3.697	\$9.21	\$4.63	\$0
MAINTENANCE COST (MM \$)	\$314.38	\$391.67	\$245.42	\$216.90	\$282.07	\$356.14	357.24
<b>TOTAL LIFE CYCLE COST (MM \$)</b>	<b>\$2,144</b>	<b>\$2,370</b>	<b>\$2,279</b>	<b>\$1,971</b>	<b>\$2,511</b>	<b>\$2,507</b>	<b>\$2,449</b>

## CONCLUSION

Based solely on a life cycle cost comparison, a frame machine would be the more economical solution for the future expansion, however, a simple cost analysis fails to include parameters such as redundancy and time to full load. Given that the future expansion requires the time to full load be under ten minutes, frame machines would need to be removed from consideration. Additionally, there

will be grid stability issues if a large frame machine trips when it needs to be operating to manage the intermittent generation resources.

The Wartsila reciprocating engine technology has a comparable life cycle cost to the aeroderivative technologies but what the analysis does not show is the burdensome effort that would be required to keep 38 machines operating and the learning curve that would come with operating and maintaining a new technology. The aeroderivative machines have the capability to meet the ramp rate and capacity requirements, while being familiar technologies to SRP. Both the aeroderivative machines would meet SRP's requirements but the GE LM6000 may be better suited for the plant due to the operator's familiarity with maintaining and operating these machines. It should also be noted that the GE LMS100 has an intercooler which increases the water usage of the machine.

There are several variants of the LM6000, and it will be important to evaluate these variants in the next stage. Both machines offer DLE and SAC combustion technologies, the latter would require water injection for emissions control. Another factor to consider is if Sprint is required for power augmentation or if evaporative cooling is sufficient to meet peak demand requirements.



## Attachment E

# SRP Summer Stakeholder Series: Since We Last Met

June 16, 2021

# Welcome

**Kelly Barr**

Associate General Manager

Chief Strategy and Corporate Services & Sustainability Executive



# Welcome SRP Board and Council Observers



**John Hoopes**  
SRP Board Vice President



**Randy Miller**  
SRP Board Member



**Anda McAfee**  
SRP Board Member



**Jack White**  
SRP Board Member



**Larry Rovey**  
SRP Board Member



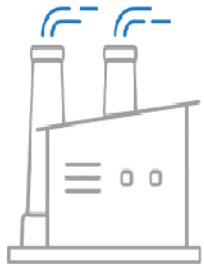
**Suzanne Naylor**  
SRP Council Member



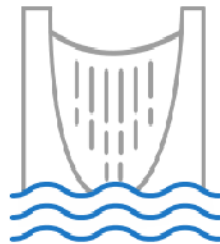
**Rocky Shelton**  
SRP Council Member



# SRP 2035 Sustainability Goals



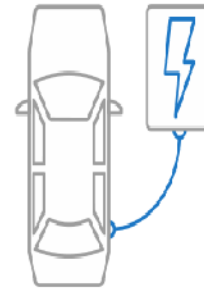
**Carbon  
Footprint**



**Water  
Resiliency**



**Supply Chain &  
Waste Reduction**



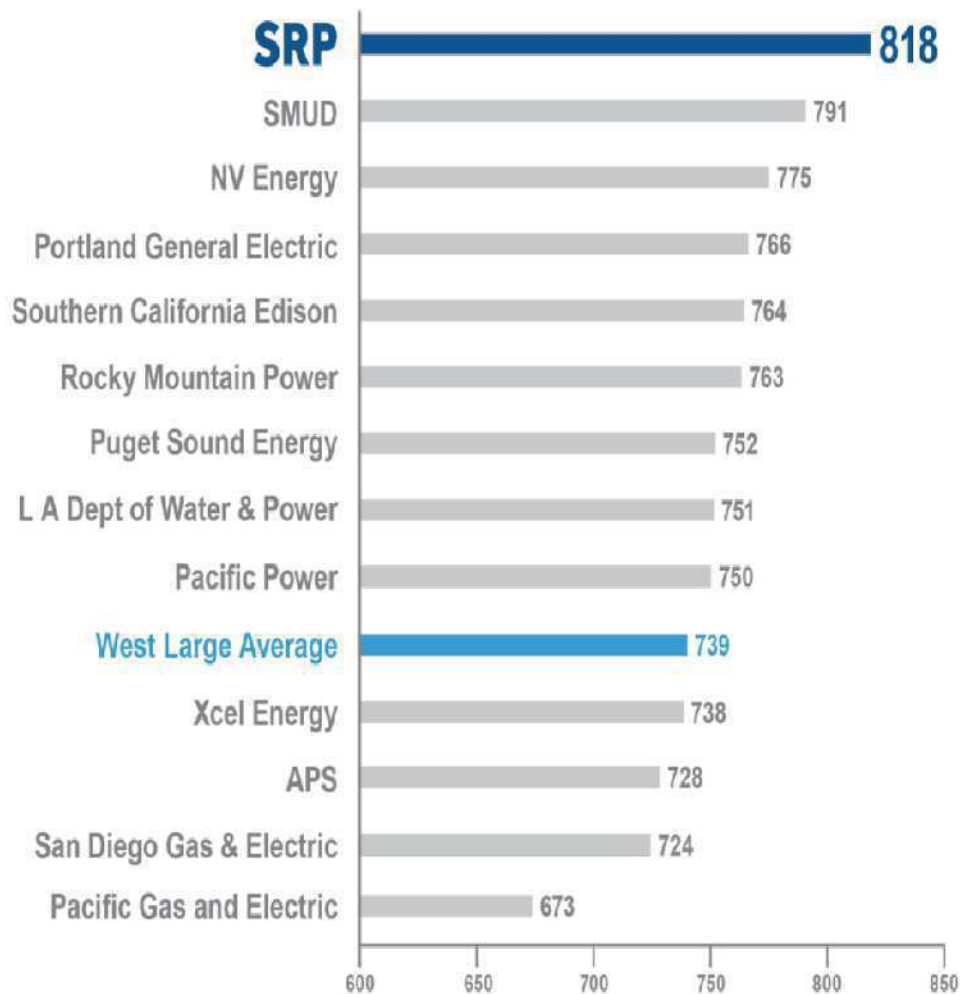
**Customer &  
Grid Enablement**



**Customer,  
Community &  
Employee  
Engagement**



# Customer Satisfaction



J.D. Power

No. 1

Electric Utility  
Residential Customer  
Satisfaction in the West

# safety minute

# Heat Stress

## Symptoms of Heat Exhaustion/Stroke

- Headache, dizziness, cramps
- Irritability, confusion, nausea, vomiting

## Prevention

- Limit activity to nights and mornings
- Take frequent breaks in shady areas
- Hydrate, hydrate, hydrate!

**azcentral.**

**Weeklong excessive heat warning issued for central Arizona; temps to reach up to 117**



# sustainability minute



# Plastic Waste

800 million tons of plastic end up in our oceans each year

## Enjoy water without waste

- Reusable water bottles - saves on average 156 plastic bottles annually
- Home filter - for a family of 4, a filter can save on average \$400 per year



# Series and Meeting Overview

**Kim Hartmann**

Facilitator (KCH Solutions LLC)

# Summer Stakeholder Series Program

June "Since We Last Met"

**Objective:** Update on actions taken in accordance with the Strategic Resource Directions from the 2017-2018 Integrated Resource Plan

**Overview of Topics:**

2017-2018 Integrated Resource Plan Refresh

2017-2018 Integrated Resource Plan Strategic Direction Progress

System Planning Foundations  
(Distribution, Transmission & Load Growth)

July "Near Term Planning"

**Objective:** Educate on forces of change affecting the industry and SRP's near-term planning focus

**Overview of Topics:**

Integrated Resource Plan to Integrated System Plan Transition

Current Planning Environment

Near Term Reliability Challenges & Solutions

August "Where We Want To Go"

**Objective:** Engage stakeholders in early development of the ISP

**Overview of Topics:**

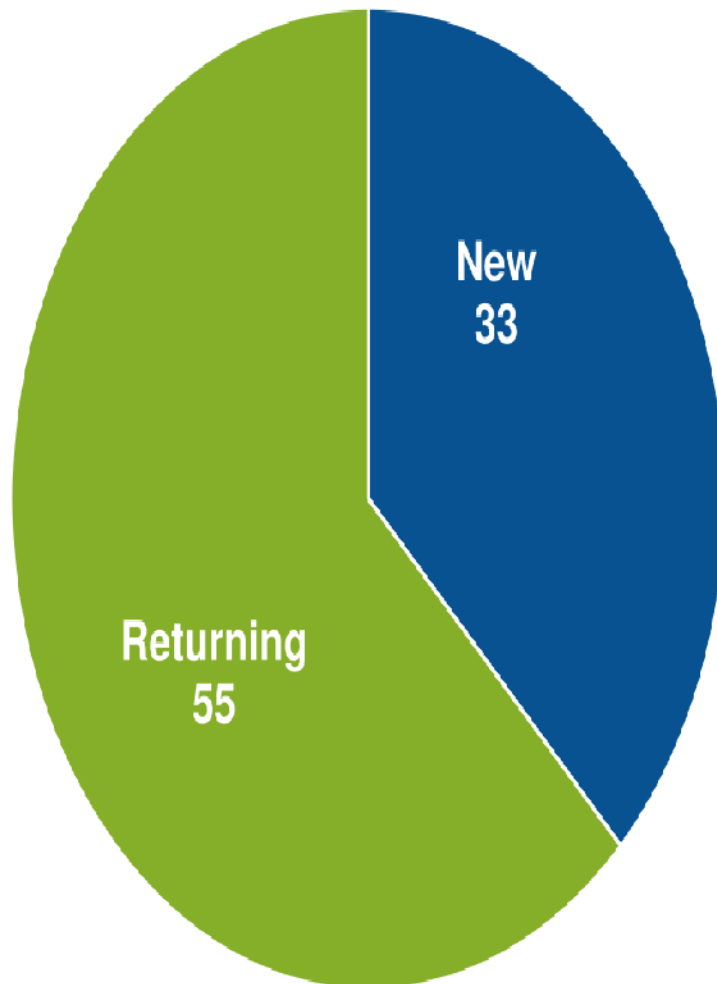
Integrated System Plan Objectives

Stakeholder Involvement Opportunities

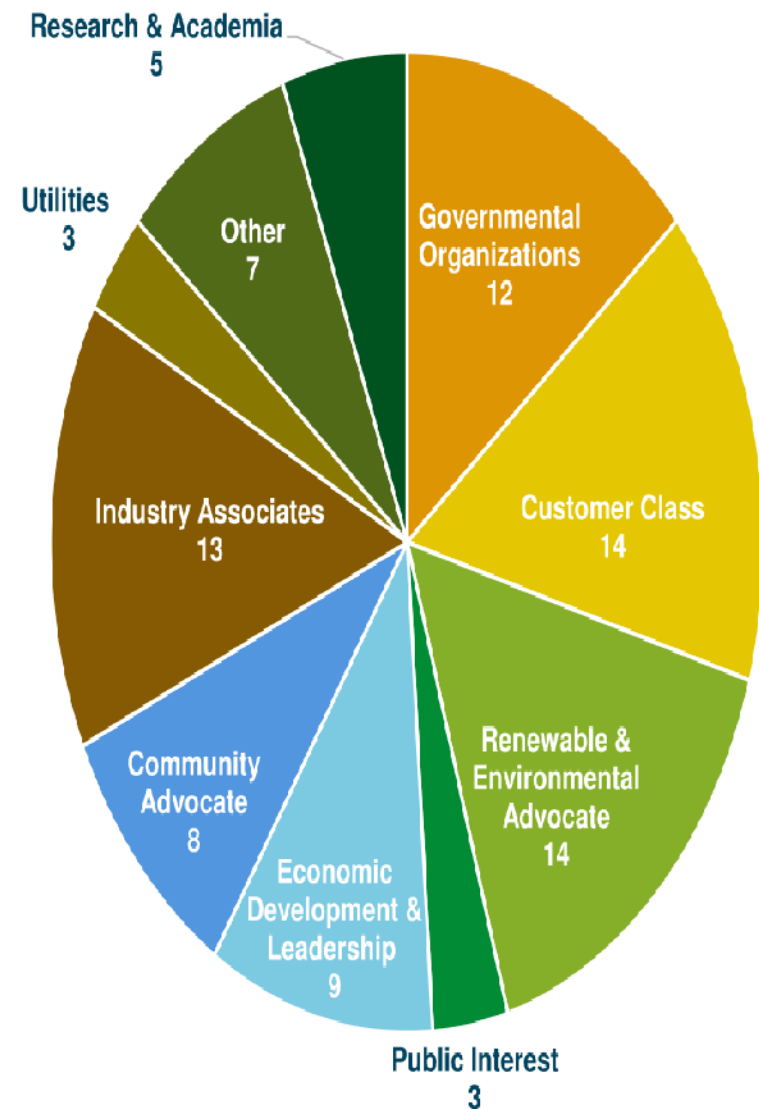
Preliminary Integrated System Plan Metric Considerations

# Community Stakeholder Participation

## Returning & New Stakeholder



## Industry/Sectors Represented by Stakeholder





# Meeting Protocols

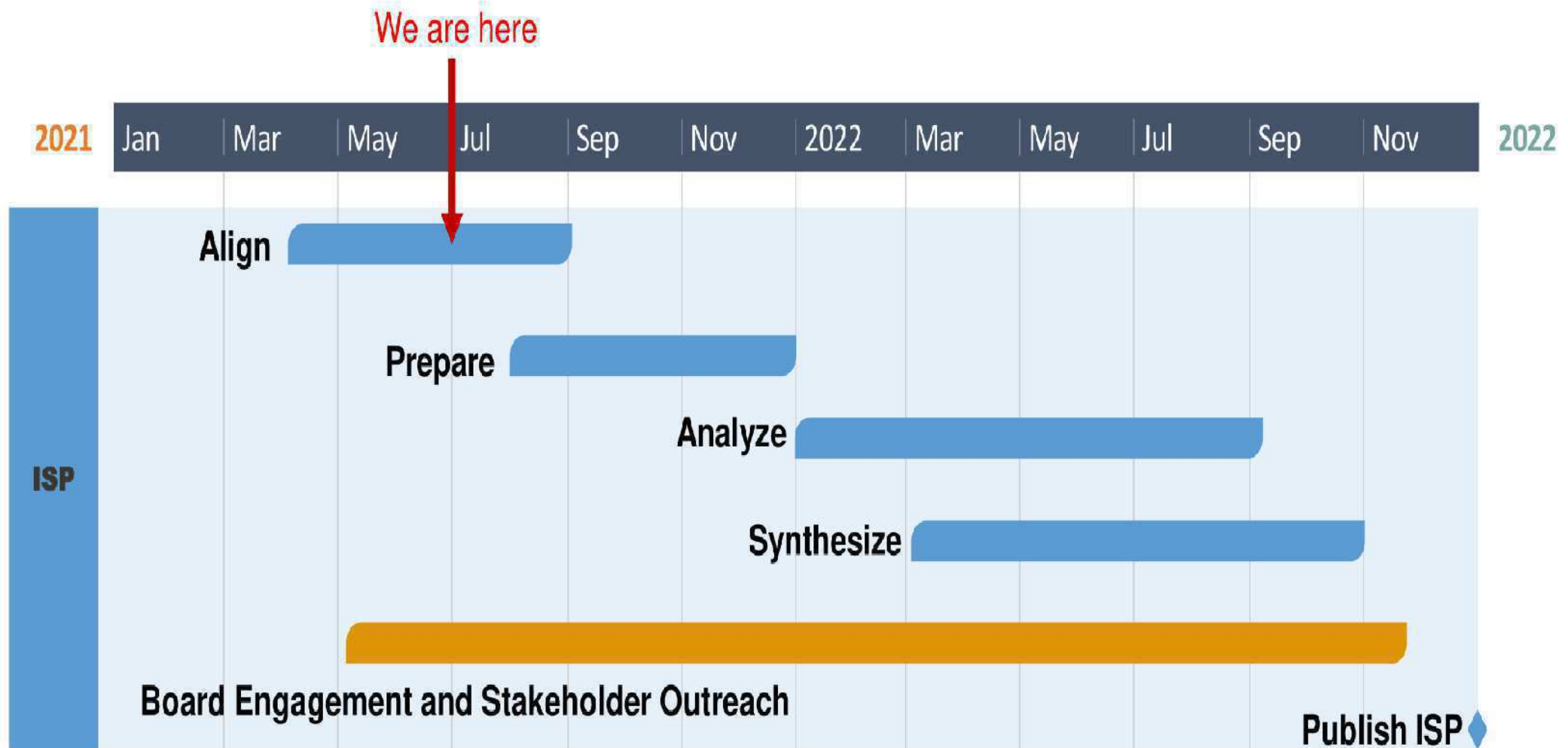
- ☐ Engagement and active participation
- ☐ Respectful and inclusive dialogue
- ☐ Chatham House rules
- ☐ Breaks when necessary (please return!)
- ☐ Notetaking matrix
- ☐ Q&A feature for questions
- ☐ Zoom poll (pulse survey) & chat box for feedback
- ☐ Microphone mostly turned off



# Agenda Overview

Time	Topics	Presenter
9:30 – 9:40	Welcome	Kelly Barr
9:40 – 9:50	Series and Meeting Overview	Kim Hartmann
9:50 – 10:00	Integrated Resource Plan (IRP) Refresh	Angie Bond-Simpson
10:00 – 11:00	IRP Strategic Directions Progress	Strategic Directions Leaders
11:00 – 11:25	System Planning Foundations	Planning Department Leaders
11:25 – 11:30	Next Steps Systems Planning	Angie Bond-Simpson

# Integrated System Planning (ISP) Timeline



# Integrated Resource Plan (IRP) Refresh

**Angie Bond-Simpson**

Manager

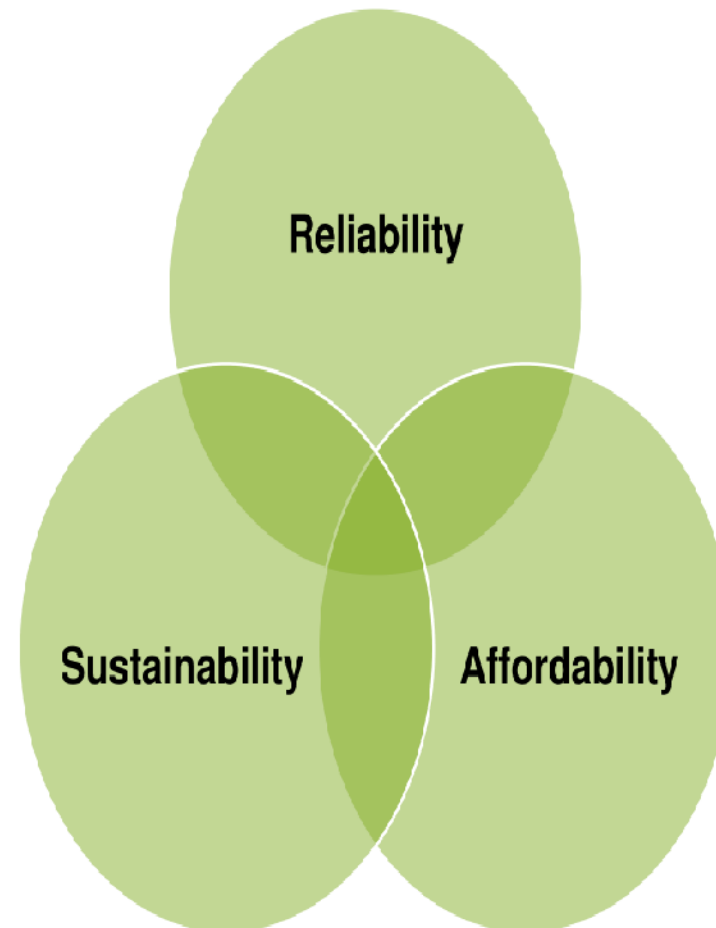
Integrated System Planning & Support (SRP)



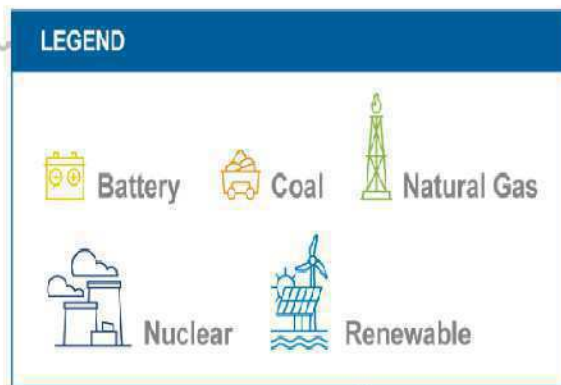
# What do we mean by Resources?

**Resources** are both the power plants generating electricity and the customer partnerships to reduce energy. Planning for new resources requires careful consideration of:

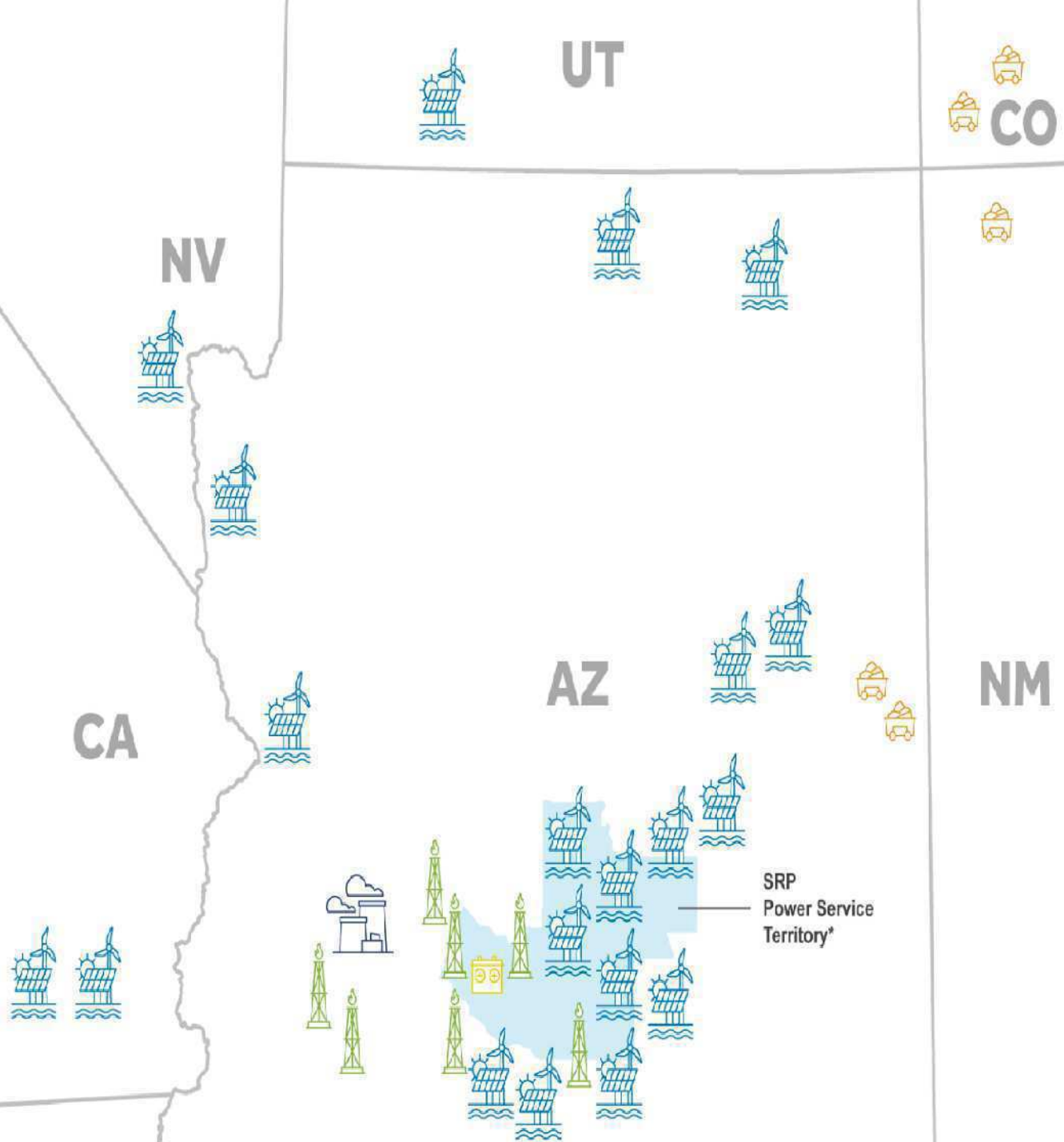
- Customer needs
- Safety
- Siting & permitting
- Financing
- Workforce
- Community
- Uncertainty



# SRP Resources Today



\*Please note map is not to scale.

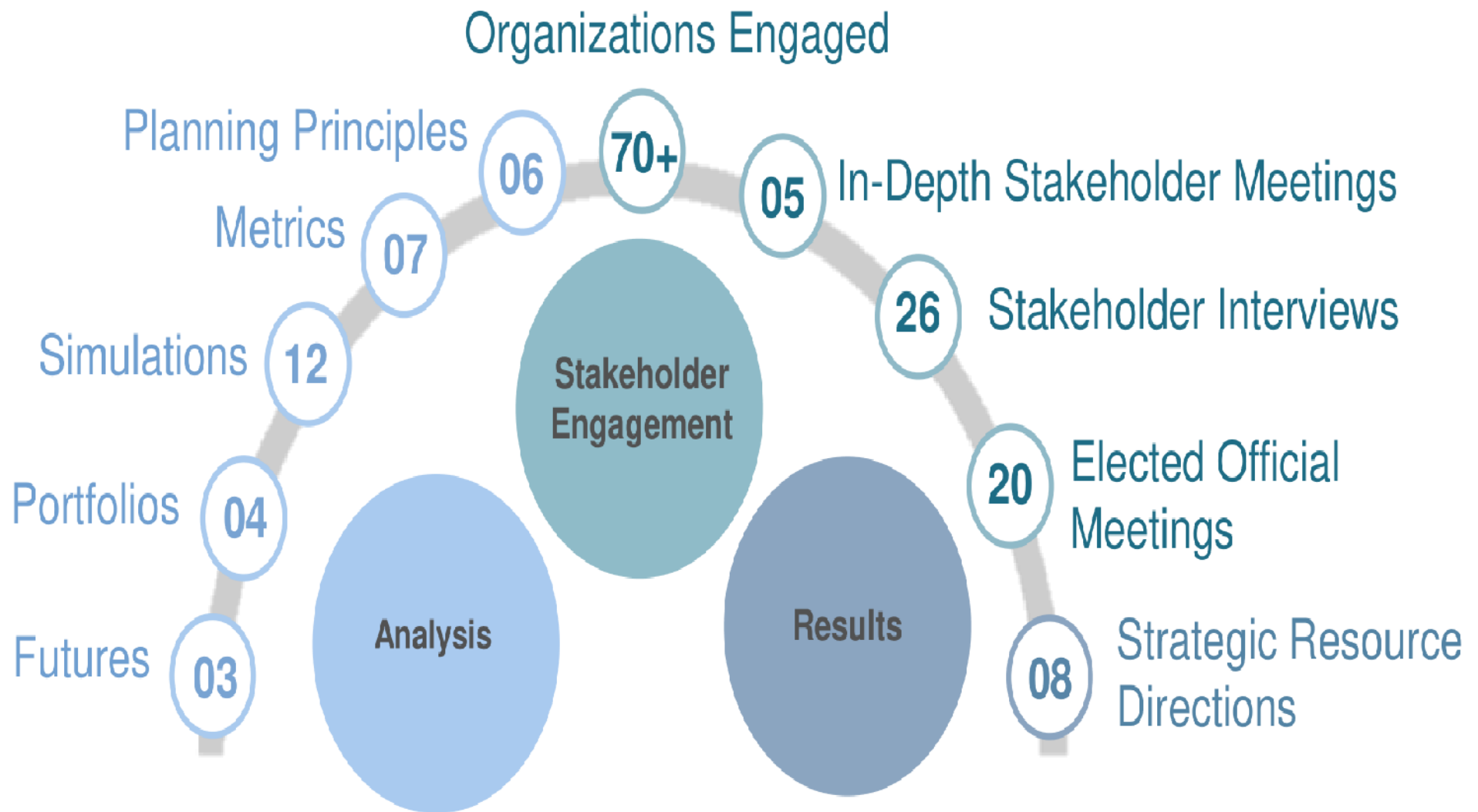


# A Look in the Rearview Mirror

## 2017 Integrated Resource Plan (IRP) Purpose

- Conduct a **robust analysis** of the business environment and resource options
- Educate and inform **balanced stakeholder** groups, **seek input**, and respond to questions
- Ensure that the resource strategic conclusion **aligns with SRP Board** policies and direction

# 2017 IRP By the Numbers





# Strategic Resource Directions



**Grow renewables**



**Reduce coal**



**Preserve option for new nuclear**



**Develop and promote  
customer programs**



**Seek battery alternatives**



**Develop flexible natural gas**



**Expand participation in regional  
transmission markets**



**Focus research on new  
technologies for generation, load  
management, storage and  
electrification**

# IRP Strategic Direction Progress

# Pulse Survey

- ❑ Given the Strategic Directions, on a scale of 1 to 5, how satisfied are you with SRP's overall progress? select one (zoom poll):
  - ❑ 1 = not satisfied, 2 = partially satisfied, 3 = moderately satisfied, 4 = mostly satisfied,
  - ❑ 5 = strongly satisfied, N/A = No Opinion
- ❑ What do you appreciate about the overall progress of the IRP strategic directions? (chat box)
- ❑ What would you like to see more of, better, or differently regarding the overall progress of the IRP strategic directions? (chat box)

# Renewables & Energy Storage

**Barry Petrey**

Manager

Resource Acquisition (SRP)





# 2019 IRP Feedback: Renewables

## What do you appreciate?

- Focus on helping **Navajo Nation** transition from coal and add more solar
- Commitment to **solar**
- Large procurements benefiting from **economies of scale**

## What would you like SRP to do more of, better or differently?

- More **wind** now that turbine technology has improved
- Increasing commitment to renewables
- Criteria for **socially responsible** procurement

# Expanded Solar Commitment

- 1000 MW by 2025 Commitment in 2018
  - Reduce CO<sub>2</sub> intensity and manage costs
  - Expand opportunities for customer dedicated projects
  - Sustainable Energy Offering benefits 33 commercial customers
- Increasing to 2,025 MW by 2025
  - 450 MW enabled by SRP commercial customer to meet its renewable commitments
  - 648 MW online or under contract
  - 1377 MW in progress for procurement



# 2025 MW of Solar by 2025



**Project:** East Line

**Developer:** sPower/AES

**Size:** 100 MW

**Status:** Online

**Commercial Operation Date (COD):** 2020

**Location:** Coolidge, AZ





# 2025 MW of Solar by 2025



**Project:** Saint  
**Developer:** NextEra  
**Size:** 100 MW  
**Status:** Online  
**Commercial Operation Date (COD):** 2020  
**Location:** Coolidge, AZ





# 2025 MW of Solar by 2025



**Project:** Central Line

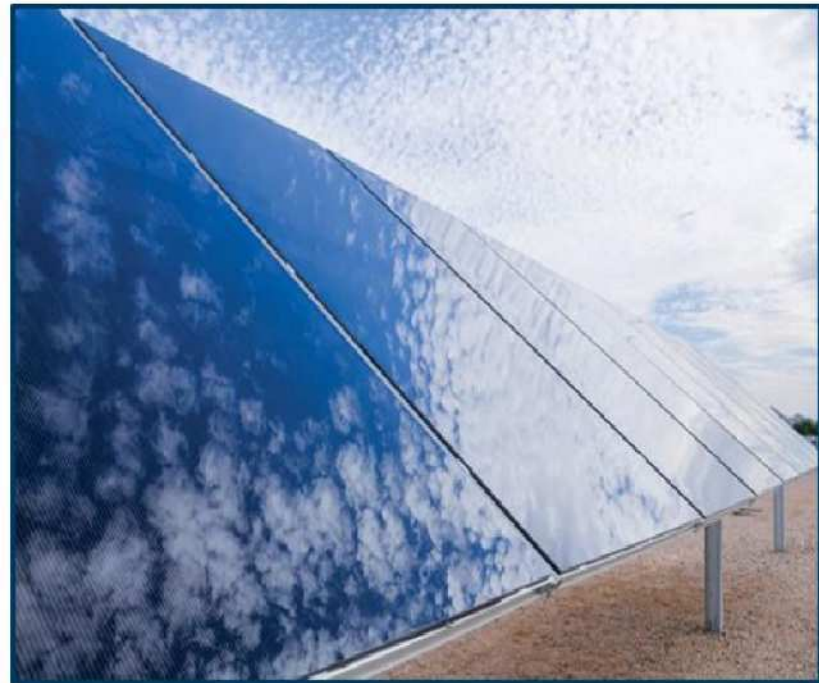
**Developer:** sPower/AES

**Size:** 100 MW

**Status:** Under Development

**Commercial Operation Date (COD):** 2021

**Location:** Coolidge/Eloy, AZ



# 2025 MW of Solar by 2025

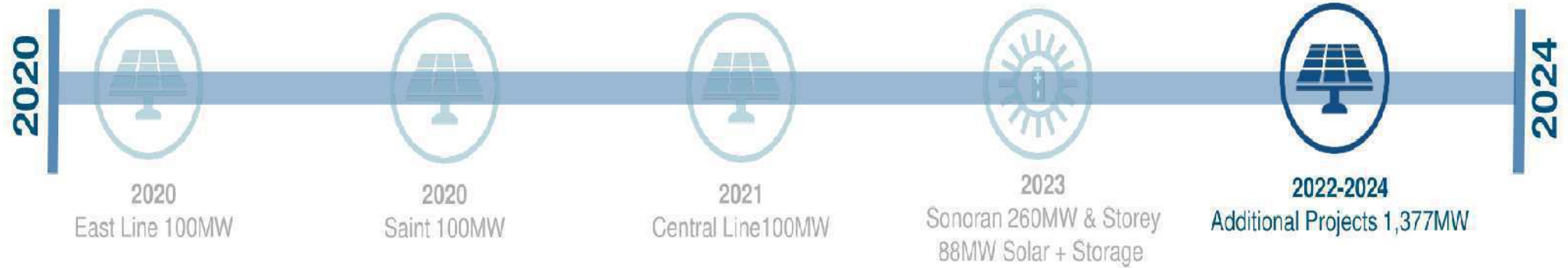


**Project:** Sonoran  
**Developer:** NextEra  
**Size:** 260 MW/ 1,040 MWh  
**Status:** Under Development  
**Commercial Operation Date (COD):** 2023  
**Location:** Little Rainbow Valley, near Gila Bend, AZ

**Project:** Storey  
**Developer:** NextEra  
**Size:** 88 MW/ 264 MWh  
**Status:** Under Development  
**Commercial Operation Date (COD):** 2023  
**Location:** Coolidge, AZ



# 2025 MW of Solar by 2025



**Project:** Additional Projects

**Developer:** Various

**Size:** 1,377 MW

**Status:** Various stages of procurement and negotiation

**Commercial Operation Date (COD):** 2022-2024





# Other Renewables



**Geothermal - Additional 69 MW**



**Wind RFI**



# Questions?



# 2019 IRP Feedback: Energy Storage

## What do you appreciate?

- Combining battery storage with solar
- Piloting projects, and waiting for cost to stabilize

## What would you like SRP to do more of, better or differently?

- Exploration of other storage technologies
- Move faster with storage

# Energy Storage Update: Developed Projects

2018



2018

Pinal Central Energy Center  
Solar + Battery PPA 20MW  
Solar & 10MW 4-hr



2019

Dorman Energy Center  
PPA 10 MW 4-hr



2021

Bolster Battery  
25 MW 4-Hr



2023

Sonoran 260MW & Storey  
88MW Solar + Storage

2024

**Project:** Pinal Central Energy Center  
**Size:** 10 MW 4-hour duration, 40 MWh  
**Configuration:** Paired and charged from 20 MW solar array  
**Commercial Operation Date (COD):** 2018  
**Location:** Coolidge, AZ



# Energy Storage Update: Developed Projects



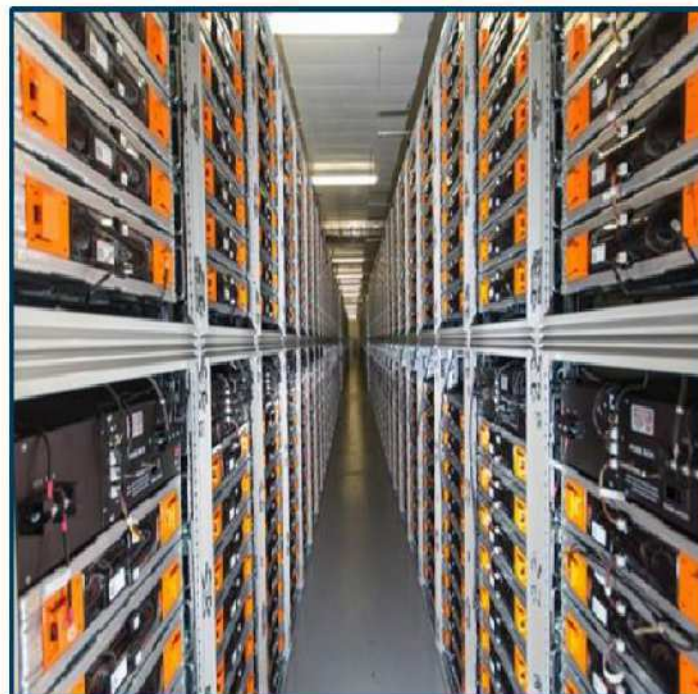
**Project:** Dorman Energy Center

**Size:** 10 MW 4-hour duration, 40 MWh

**Configuration:** Stand alone and grid charged

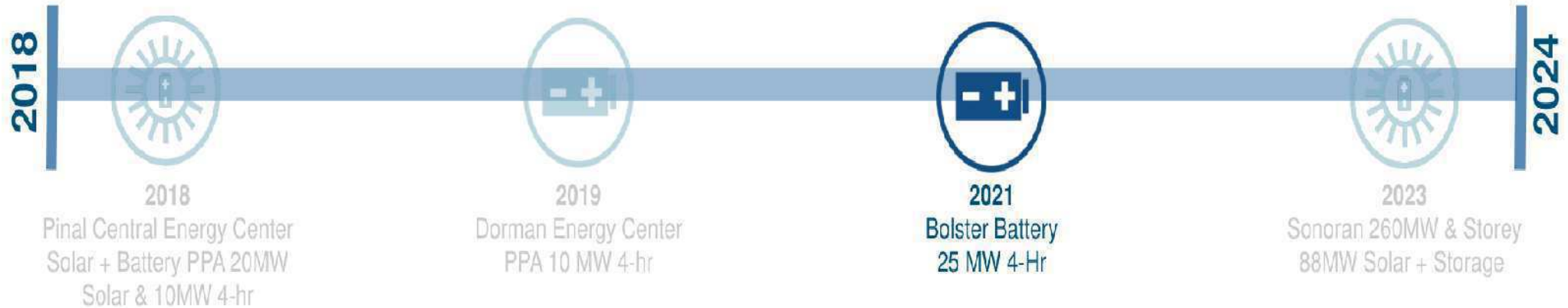
**Commercial Operation Date (COD):** 2019

**Location:** Chandler, AZ





# Energy Storage Update: Developed Projects



**Project:** Bolster Battery

**Size:** 25 MW 4-hour duration, 100 MWh

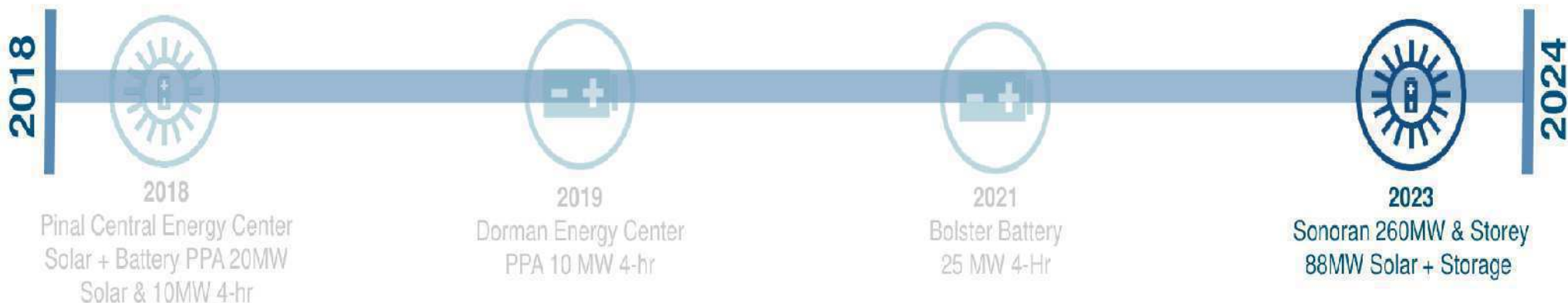
**Configuration:** Stand alone and grid charged

**Commercial Operation Date (COD):** 2021

**Location:** Glendale, AZ



# Energy Storage Update: Projects Under Development



## **Project: Sonoran**

**Size:** 260 MW, 4-hour duration battery, 1040 MWh

**Configuration:** Paired and charged from 260 MW solar array

**Commercial Operation Date (COD):** 2023

**Location:** Little Rainbow Valley, near Gila Bend, AZ

## **Project: Storey**

**Size:** 88 MW, 3-hour duration battery, 264 MWh

**Configuration:** Paired and charged from 88 MW solar array

**Commercial Operation Date (COD):** 2023

**Location:** Coolidge, AZ



# Questions?

# Coal & Flexible Natural Gas

**Chico Hunter**

Manager

Resource Planning & Development (SRP)



# 2019 IRP Feedback: Reduce Coal

## What do you appreciate?

- Thoughtfulness in **HOW** to transition from coal
- Working with impacted community and employees
- **Glide path approach**
- Moving in the **right direction**.

## What would you like SRP to do more of, better or differently?

- **Eliminate** coal entirely
- **Biomass transition**



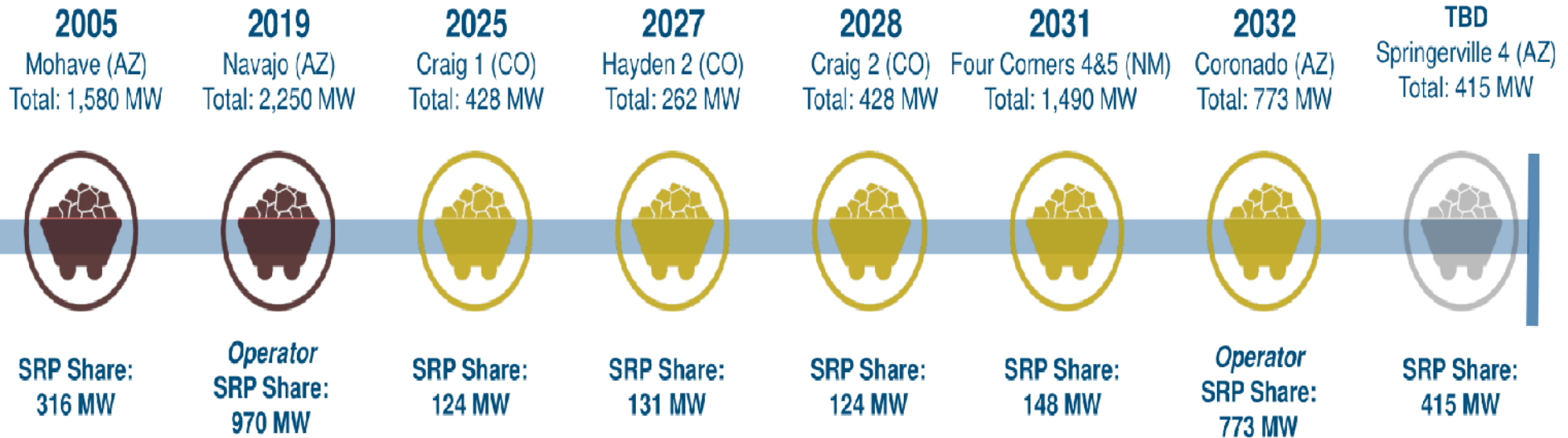
# Reduce Coal: Retirements



~ 1,300 MW Retired

~ 1,300 MW Announced

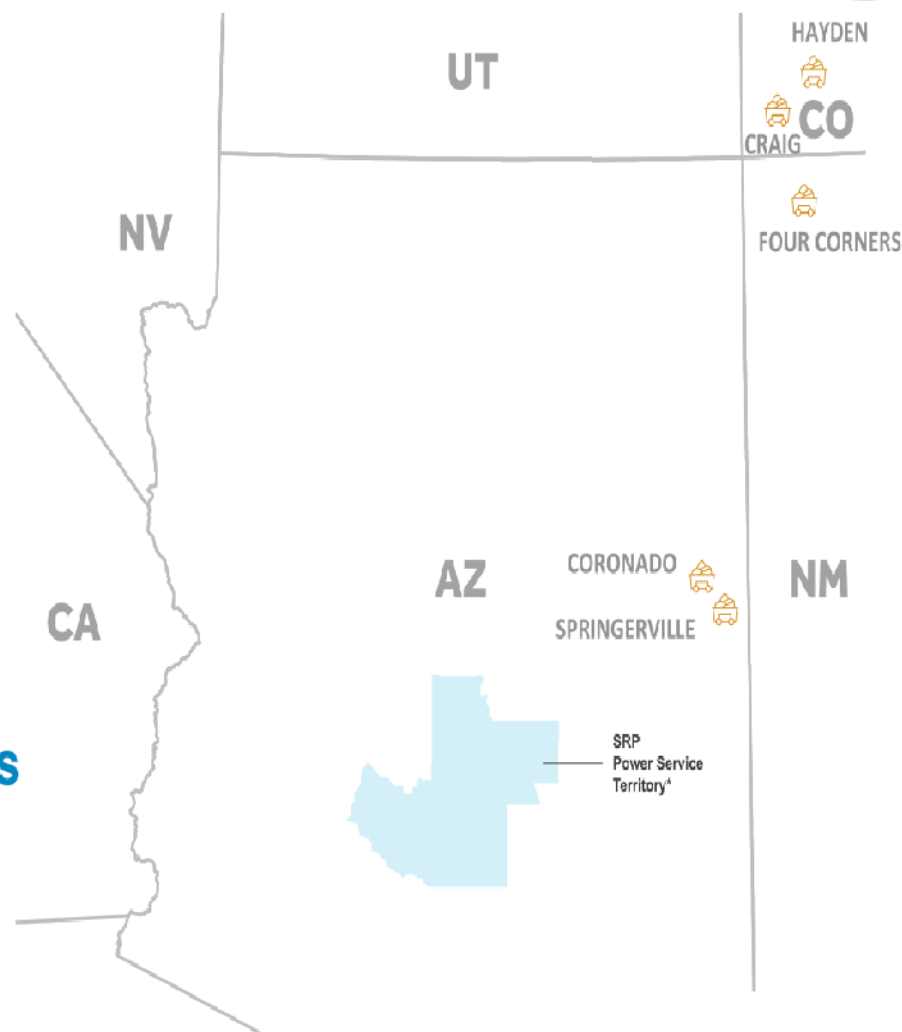
2005



# Reduce Coal: Seasonal and Reduced Usage



- **Variety of drivers**
  - Regional Haze regulations
  - Low natural gas prices
  - Low day-time market prices in spring/fall
  - Integration of renewables
- **Cost and emission benefits for SRP customers and the region**



\*Please note map is not to scale.

# Questions?



# 2019 IRP Feedback: Flexible Natural Gas

## What do you appreciate?

- Uncompromising commitment to **reliability**
- No plans for additional combined cycle gas
- **Integration** of gas with renewables

## What would you like SRP to do more of, better or differently?

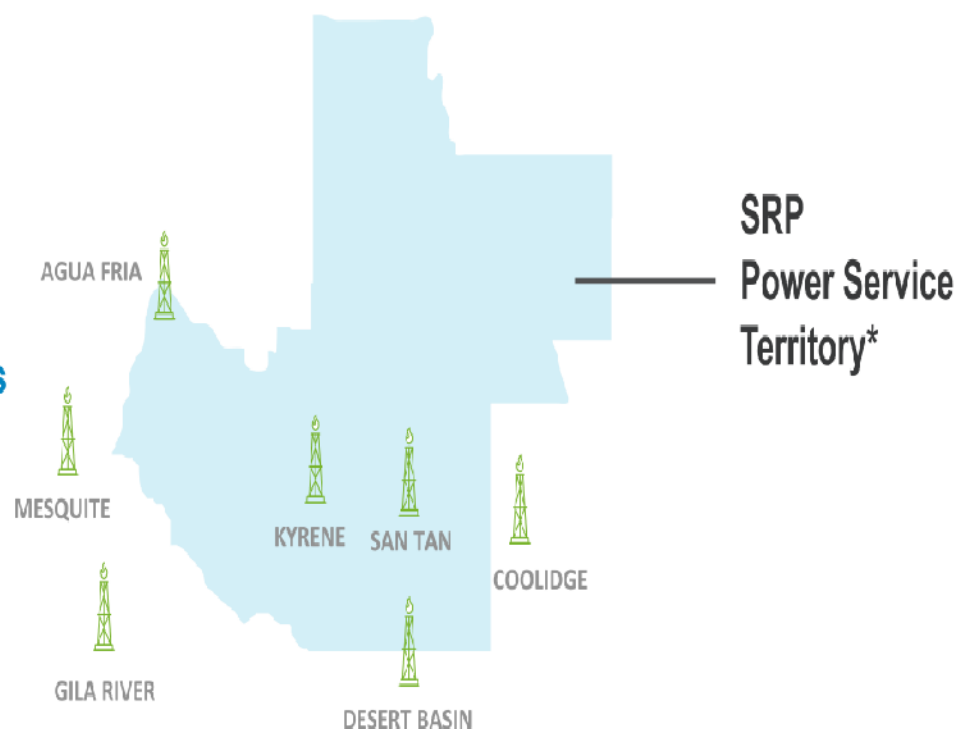
- Emphasis on **flexibility**
- **No new** natural gas resources - pursue more renewables
- Partner with other utilities on gas facilities and operations



# Flexible Natural Gas: Leverage Existing Plants



- **Bought Coolidge Generating Station (575 MW) in 2019**
  - Flexible units that can start up in 10 minutes
  - Valuable for system reliability, solar integration, peak loads
  - 30% hydrogen blend capable
- **Pursuing gas upgrades across 12 combined cycle units**
  - Work started in 2020, scheduled through 2024
  - Increase operational flexibility with lower turn-down capabilities
  - Improve efficiency, reducing carbon intensity by 1.5%
  - 312 MW total increased output capacity
  - Enable 40% hydrogen (H<sub>2</sub>) blending capability



\*Please note map is not to scale.

# Flexible Natural Gas: New Small Turbines



Four new peaking units added to Agua Fria and Desert Basin (two units at each)



176 MW to meet unexpected customer demand growth in summer 2022



Expected commercial operation date (COD) of June 1, 2022



Ensures grid reliability as SRP accelerates renewable integration



Proven technology, identical to Coolidge Generating Station units



30% hydrogen capable

# Questions?

# Nuclear

**Tom Cooper**

Director

Strategic Planning and Economic Development (SRP)





# 2019 IRP Feedback: Nuclear

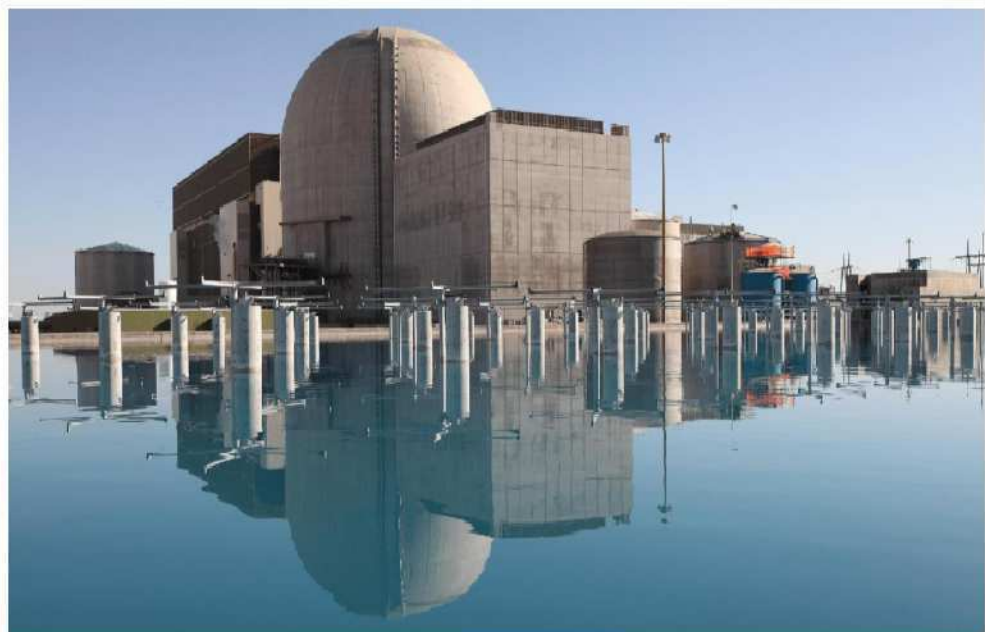
## What do you appreciate?

- Stepping back from new nuclear is prudent
- Keeping carbon-free baseload as option

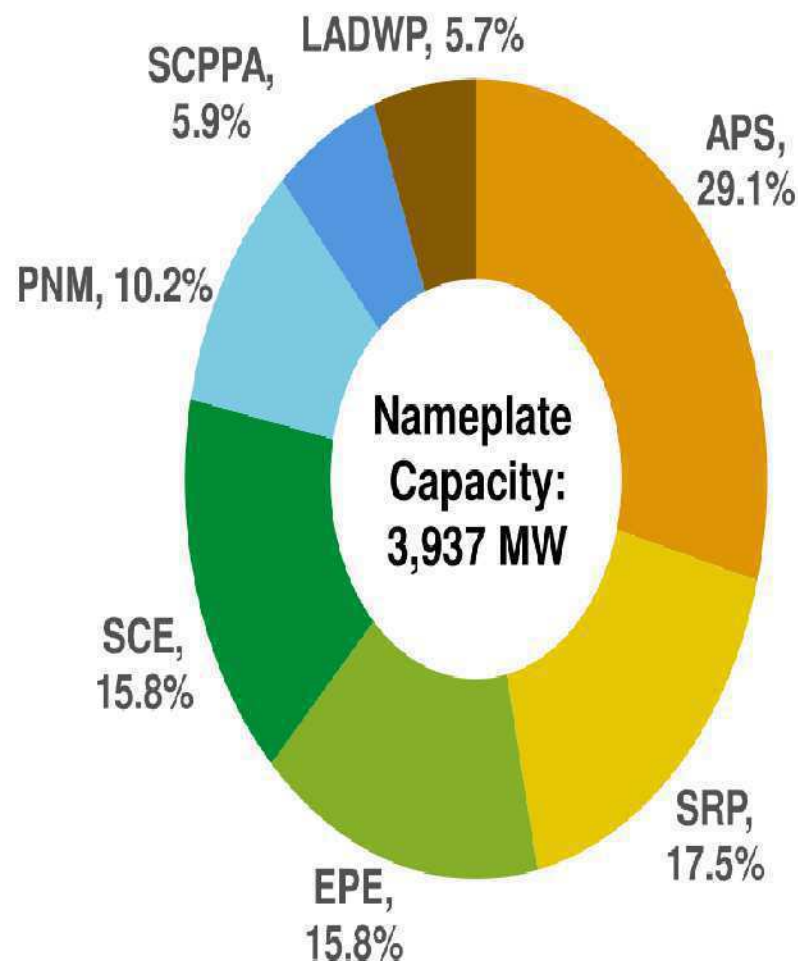
## What would you like SRP to do more of, better or differently?

- Nuclear power for desalination and hydrogen production

# Palo Verde Nuclear Generating Station (PVNGS)



- ❑ Largest nuclear power plant in the U.S.
- ❑ The three units began operations between 1986 and 1988
- ❑ SRP will acquire an additional 114 MW from PNM's share in 2023-2024



# Questions?

# Market Resources

**Bobby Olsen**

Director

Supply and Trading & Fuels (SRP)





# 2019 IRP Feedback: Market Resources

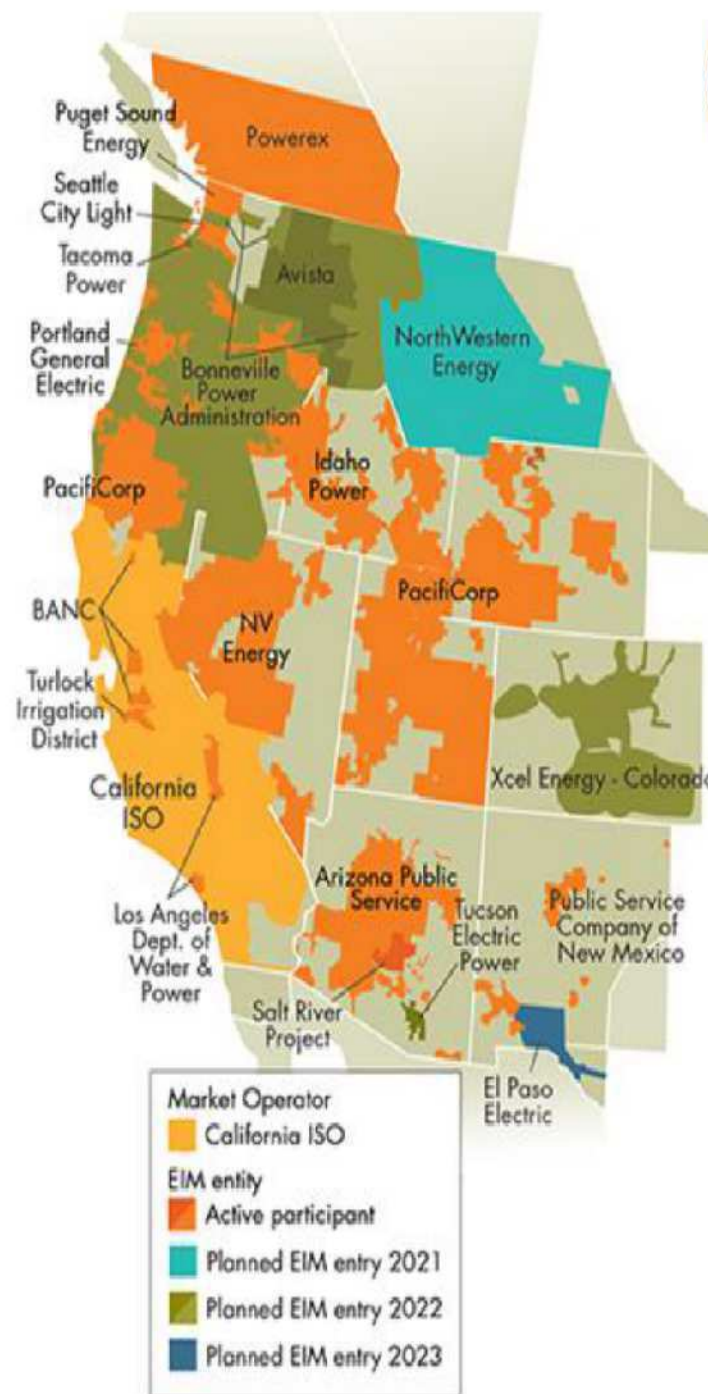
## What do you appreciate?

- Using the market as generation asset
- Joining EIM
- Engagement in the design of the EIM day ahead market.

## What would you like SRP to do more of, better or differently?

# Organized Energy Markets

- Joined the California Independent System Operator (CAISO) Western Energy Imbalance Market (EIM), a real time energy market, in April 2020
- Currently exploring options in day ahead markets, focusing on CAISO's proposal
- Developing principles and critical requirements for long-term regional planning and the concept of Regional Transmission Operators (RTOs)



# Questions?

# Customer Programs

**Nathan Morey**

Manager

Product Development (SRP)





# 2019 IRP Feedback: Customer Programs

## What do you appreciate?

- Multi-prong approach focused on improving customer service
- Thoroughness of the research and evaluation
- Leadership role

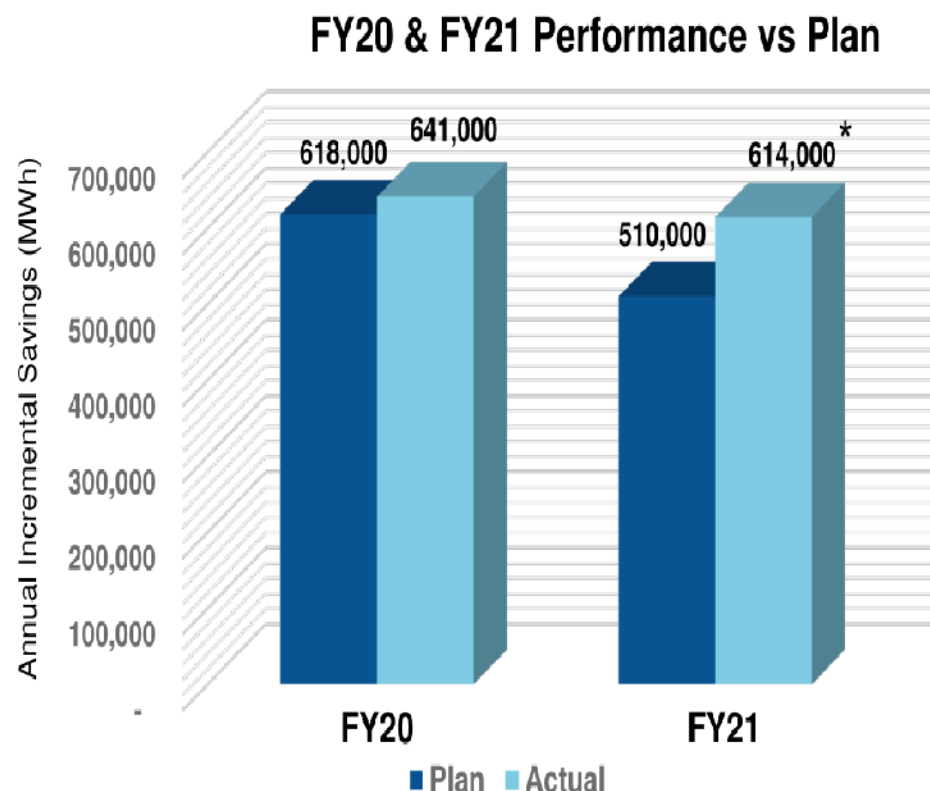
## What would you like SRP to do more of, better or differently?

- More opportunity for aggregated residential demand response
- Creation of a beneficial electrification road map

# Energy Efficiency Update



- Exceeded annual energy-saving targets in each of the past two years
- Completed and retired the Sustainable Portfolio Principles Objective
- Transitioned to the new 2035 Sustainability Goals & action plans
- Greater focus on AC-related measures, business programs, underserved market segments and smart thermostats



\* Represents preliminary, unaudited year-end energy savings value

# Accelerated Demand Response Plan



- Grow DR portfolio capacity to deliver 150 MW by summer of CY22
- Accelerate enrollments through aggressive marketing and recruitment efforts
- Begin to develop weekend DR capacity in CY22

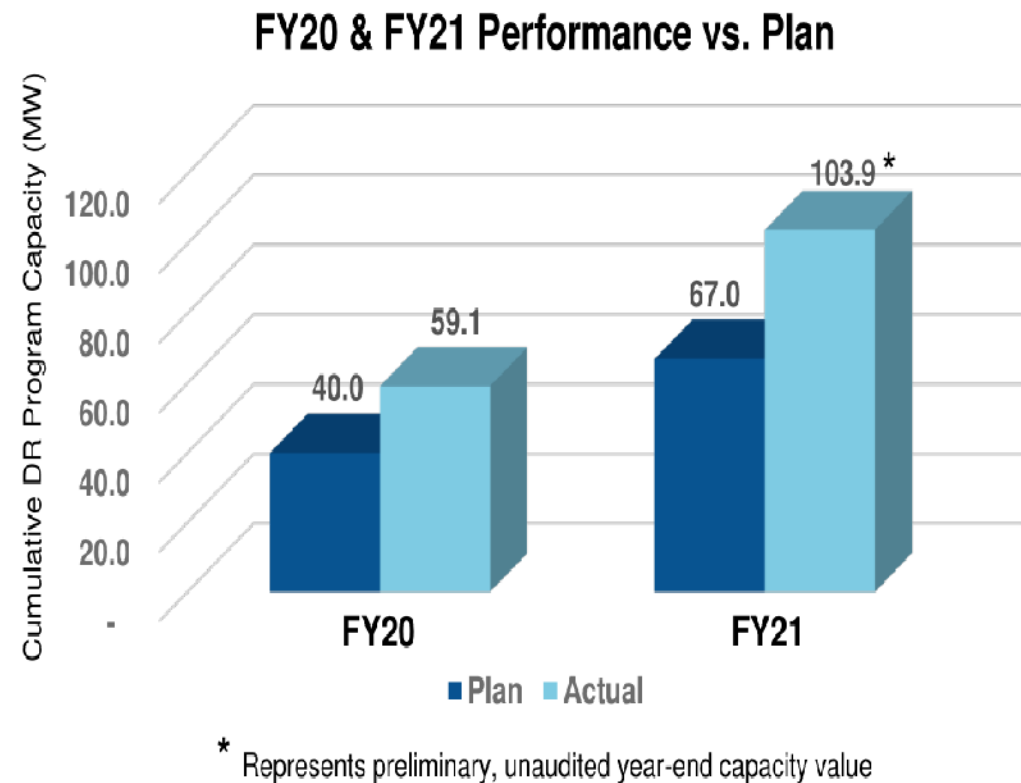
Demand Response Capacity Plan

	CY20	CY21	CY22	CY23	CY24
<b>FP21 Plan (MW)</b>	<b>67</b>	<b>95</b>	<b>120</b>	<b>138</b>	<b>150</b>
Incremental Bring Your Own Thermostat		+5	+15		
Incremental Business Demand Response		+10	+15		
<b>FP22 Plan (MW)</b>	<b>67</b>	<b>110</b>	<b>150</b>	<b>150</b>	<b>150</b>

# Demand Response Update



- Surpassed annual cumulative DR portfolio capacity goals in the past two years
- Launched new Business Demand Response program – well received
- Expanded Residential Bring Your Own Thermostat program
- Dispatched DR events performing as expected





# Electric Vehicle & Electric Technologies Update



- Exceeded annual Electric Vehicle and Electric Technologies program targets
- Launched numerous new EV programs and initiatives
  - Business EV Charging Rebate Program
  - ENERGY STAR Homes EV Make-ready Builder Rebate
  - Residential Smart Charger Program
  - Plug-In and Save Rebate Program
  - SRP EV Infrastructure Program
  - Transportation Electrification Activator
- Continued E-Tech program growth through electric forklifts and custom projects

Electric Vehicle  
Exceeded 17,000 VIO  
goal with 20,629 \* EVs in  
SRP Service Territory  
in FY21

Electric Technologies  
Surpassed 8,400 MWh of  
energy impact goal by  
delivering 11,428\* MWh  
in FY21

# Questions?

# New Technologies

**Kara Montalvo**

Director

Environmental Services (SRP)



# 2019 IRP Feedback: New Technologies

## What do you appreciate?

- Engaging the innovative community and ecosystem
- Diversity and interest in forward looking technologies
- Practical solutions that customers can benefit from

## What would you like SRP to do more of, better or differently?

- Seasonal storage
- Technologies that connect customers to power markets
- Quantify benefits of technology and research

# New Technologies



## SRP Innovation & Technology Pipeline

### Near-term Operational Readiness

- Solar dispatch
- Battery use
- Electric vehicle enablement
- Customer-sided technology

### Longer-term Technology Development

- Long-duration storage
- H2 work group
- Low Carbon Resources Initiative





# Questions?

# Pulse Survey

- ❑ Given the Strategic Directions, on a scale of 1 to 5, how satisfied are you with SRP's overall progress? select one (zoom poll):
  - ❑ 1 = not satisfied, 2 = partially satisfied, 3 = moderately satisfied, 4 = mostly satisfied,
  - ❑ 5 = strongly satisfied, N/A = No Opinion
- ❑ What do you appreciate about the overall progress of the IRP strategic directions? (chat box)
- ❑ What would you like to see more of, better, or differently regarding the overall progress of the IRP strategic directions? (chat box)

# System Planning Foundations

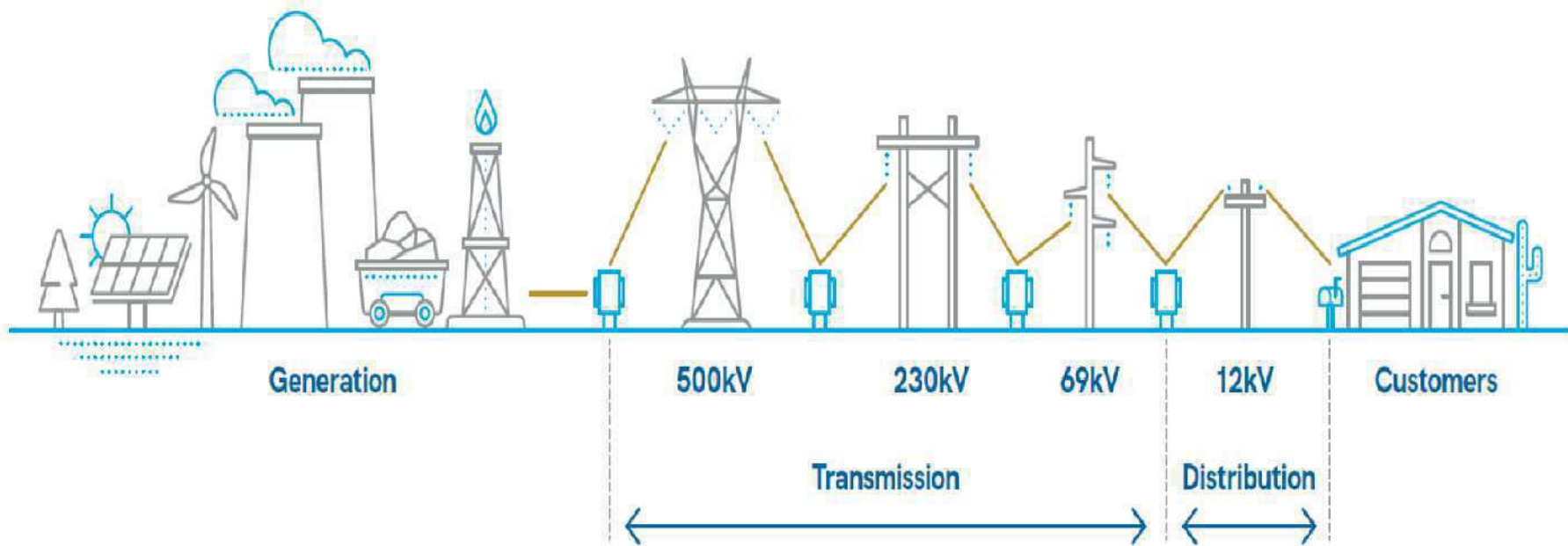
# Transmission Planning

**Bryce Nielsen**

Director

Transmission Planning, Strategy & Development (SRP)

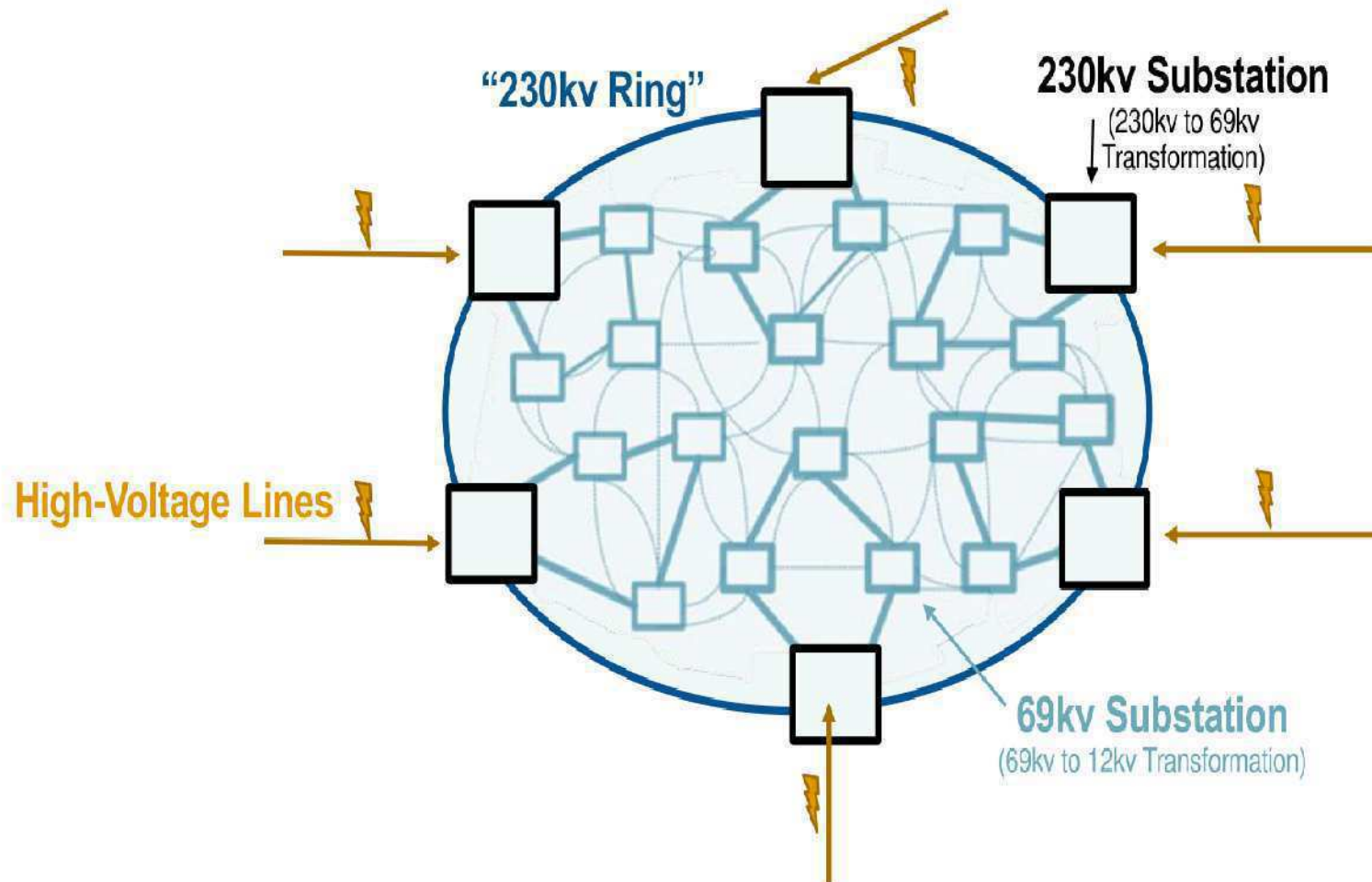
# Generation to Load



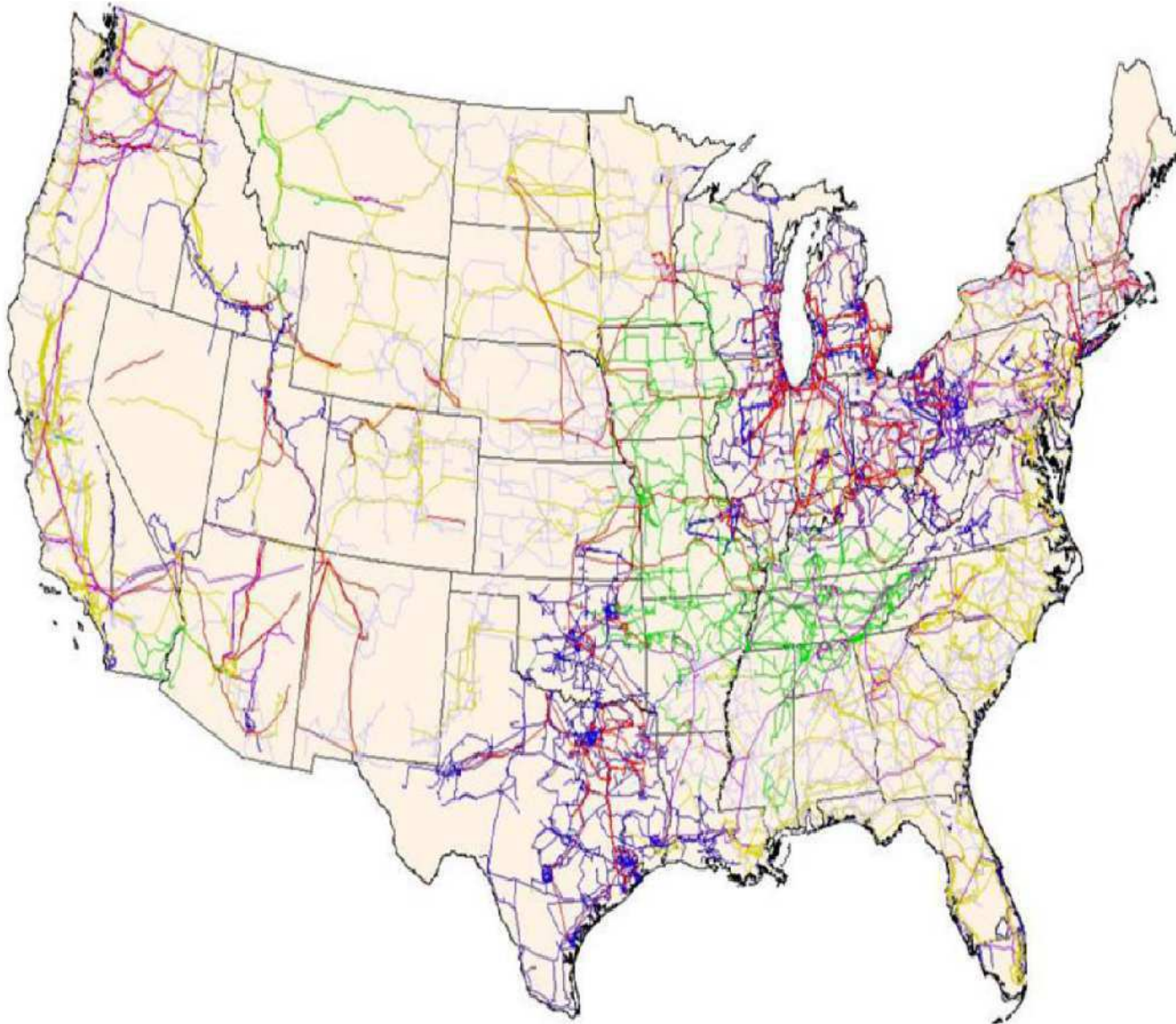


# SRP's Transmission Network

## SRP Service Territory



# US Transmission System



# Transmission Key Considerations

- Regional connections
- Regulatory compliance
- Siting/Permitting
- Cost
- Original configuration based on traditional resources

# Questions?

# Distribution Planning

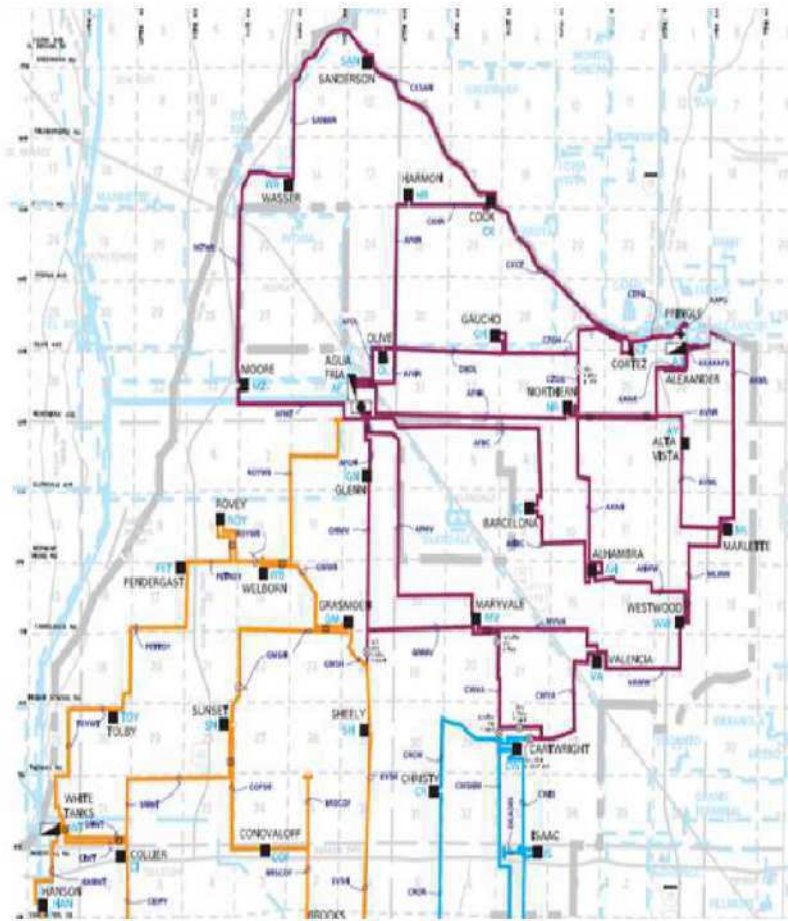
**Vanessa Kisicki**

Director

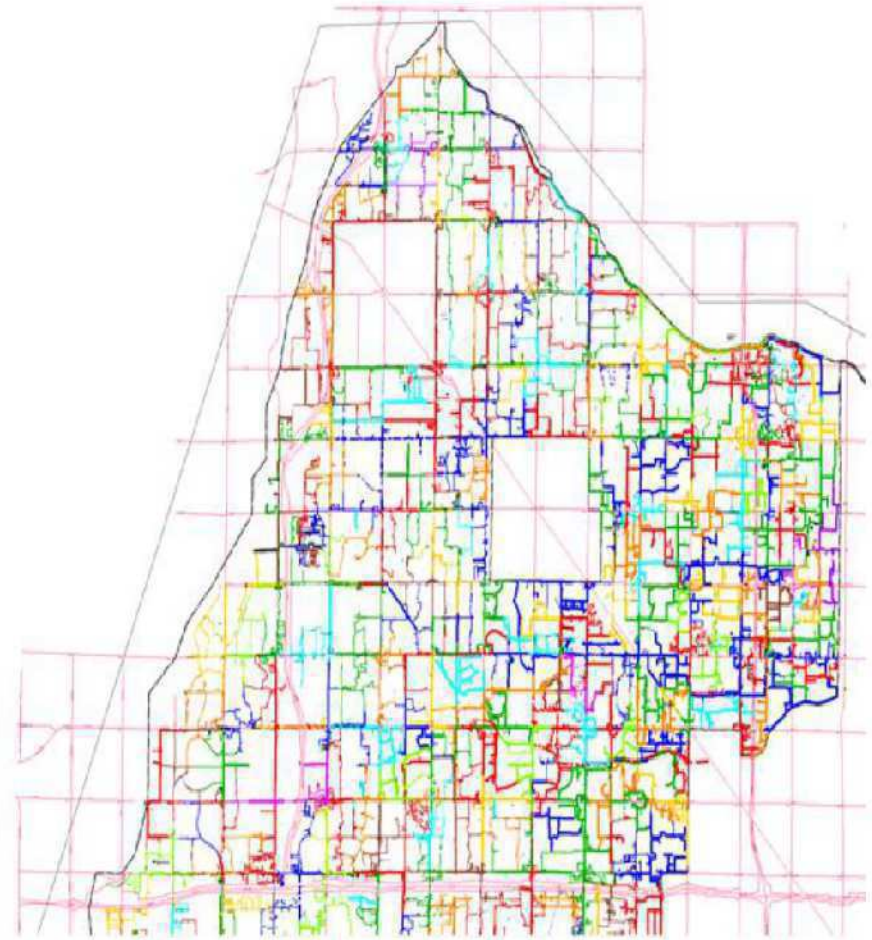
Distribution Strategy (SRP)



# Planning for Distribution



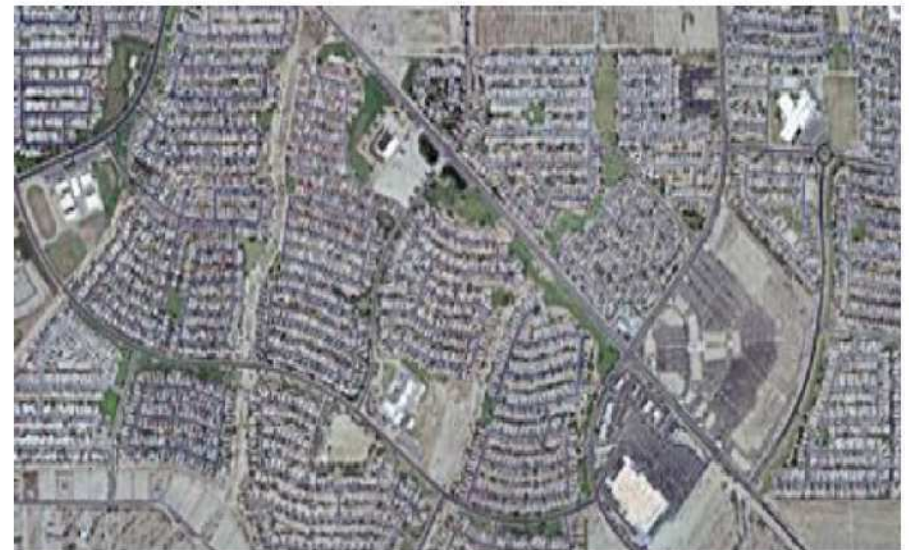
69 kV Transmission Lines



12 kV Distribution Circuits

# Traditional Distribution Planning Focus

- Provide service to meet customer needs
- Provide infrastructure for reliability
- Proactive system development
- Manage costs



# Distribution Key Considerations

- Increasing amounts of solar, storage and electric vehicles
- Increasingly dynamic nature of the distribution system
- New options to mitigate constraints
- Customer engagement

# Questions?

# Load Growth

**Harry Sauthoff**  
Manager  
Forecasting (SRP)



# Load Growth: Forecast Process

## Key Drivers

Economy  
Population  
SRP Programs  
DER  
Econ Development



## Forecast Outlook

Peak Demand  
Energy Sales  
Accounts



## Impacts

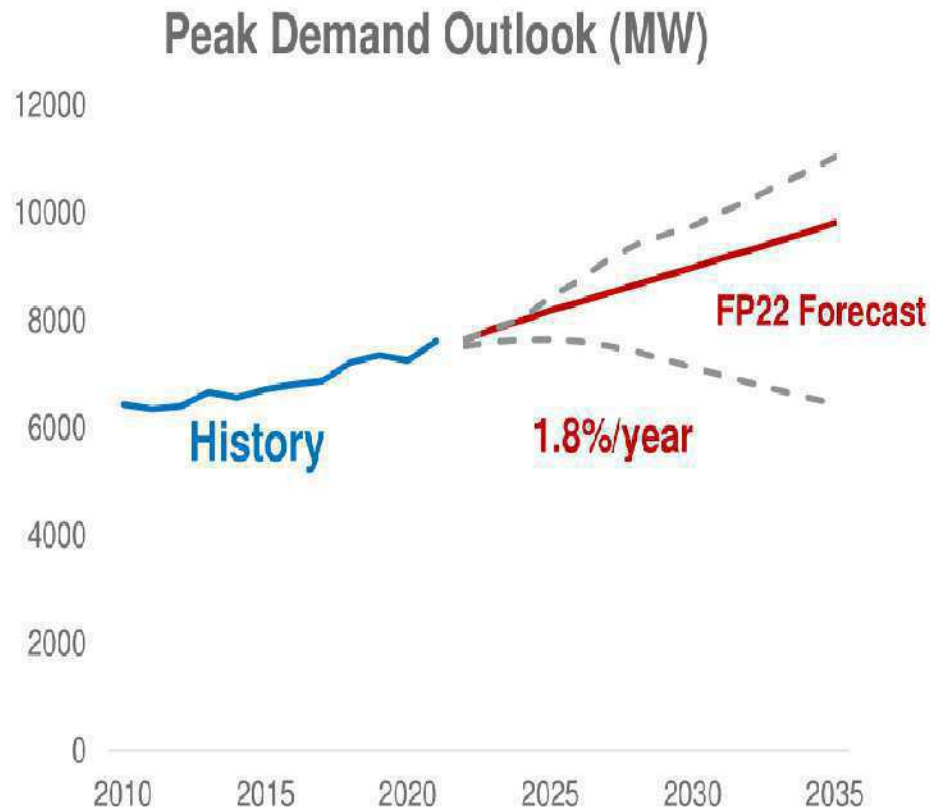
Financial Plan  
Resource Plan  
Transmission Plan  
Distribution Plan

# Load Growth: Forecast – Key Drivers

- Economy/Population Outlook
- Economic Development
- SRP Customer Programs
- Electric Vehicles
- Rooftop Solar
- Customer-Owned Batteries
- Weather



# Load Growth: Forecast Outlook



20B Arizona expansion will bring 3,000 new high-wage jobs – AZ Republic



*Demand for new homes in metro Phoenix soars -*  
**AZ Republic**

*Economists: Arizona to regain all jobs lost in the pandemic in 2021 – Phoenix Business Journal*



**ElectraMeccanica picks Mesa as electric vehicles manufacturing site -**  
**AZBIGMEDIA**



# Questions?

# Next Steps: System Planning

**Angie Bond-Simpson**

Manager

Integrated System Planning & Support (SRP)



# SRP's System Planning Vision



## The ISP identifies:

- Viable pathways for achieving SRP's 2035 Corporate Goals
- Costs, risks and tradeoffs of the different pathways
- System solutions valuable across different pathways
- Needed new capabilities or tools

# Summer Stakeholder Series Program

June "Since We Last Met"

**Objective:** Update on actions taken in accordance with the Strategic Resource Directions from the 2017-2018 Integrated Resource Plan

**Overview of Topics:**

2017-2018 Integrated Resource Plan Refresh

2017-2018 Integrated Resource Plan Strategic Directions Progress

System Planning Foundations  
(Distribution, Transmission and Load Growth)

July "Near-Term Planning"

**Objective:** Educate on forces of change affecting the industry and SRP's near-term planning focus

**Overview of Topics:**

Integrated Resource Plan to Integrated System Plan Transition

Forces of Change

Near-Term Reliability Challenges & Solutions

August "Where We Want To Go"

**Objective:** Engage stakeholders in early development of the ISP

**Overview of Topics:**

Integrated System Plan Objectives

Stakeholder Involvement Opportunities

Preliminary Integrated System Plan Metric Considerations

# Welcome Kearns & West

**Joan Isaacson**

Principal

Public Involvement and Facilitation (Kearns & West)

**thank you!**

## Attachment F



# SRP Summer Stakeholder Series – Near-Term Planning

July 22nd, 2021

# Welcome

Kelly Barr

Associate General Manager Chief Strategy and Corporate Services & Sustainability Executive

# safety minute

# Attack Backing

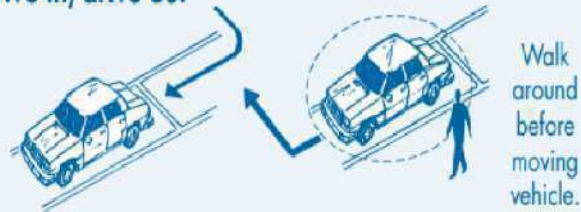
## ATTACK BACKING

### ***Attack Backing Program:***

Attack Backing is a program to eliminate backing whenever possible. This approach to backing vehicles should help SRP reduce the number of preventable vehicular accidents.

When parking, eliminate backing whenever possible.

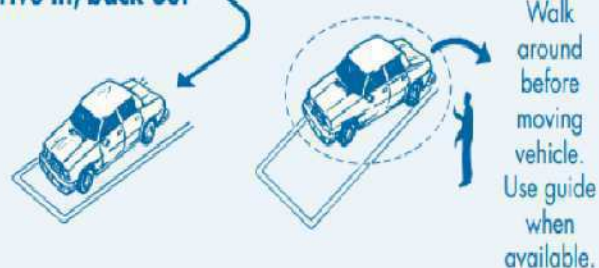
#### **① Drive in/drive out**



#### **② Back in/drive out**



#### **③ Drive in/back out**



# sustainability minute



# Carpooling

Carpooling reduces the number of automobiles needed by travelers.

## Societal Benefits Include:

- Reductions in energy consumption and emissions
- Congestion mitigation
- Reduced parking infrastructure demand



# Welcome SRP Board and Council Observers



**John Hoopes**  
SRP Vice President



**Randy Miller**  
SRP Board Member



**Anda McAfee**  
SRP Board Member



**Jack White**  
SRP Board Member



**Larry Rovey**  
SRP Board Member



**Suzanne Naylor**  
SRP Council Member



**Rocky Shelton**  
SRP Council Member





# June Meeting Feedback:

## Overall Meeting Experience?

- The time spent, logistics, overall understanding and pre-read material was all beneficial with insignificant disagreement.

## What would you like SRP to do more of, better or differently in future meetings?

- Make the case on **why this shift from IRP to the ISP** is timely and necessary
- Ask **stakeholders** what kind of information coming out of the **ISP would be valuable**
- **Format**
  - **More time for questions & discussion**
  - **Chat and Q&A visible by all**



# Welcome SRP Team and Kearns & West





# Summer Series and Meeting #2 Overview

**Joan Isaacson, Facilitator**  
Kearns & West

# ISP Summer Series Overview

## Meeting #1

### Since We Last Met

Update on 2017-18 IRP Strategic Resource Directions progress.

## Meeting #2

### Near Term Planning

Educate on forces of change affecting the industry and near-term planning  
Collect perspectives and input from stakeholders.

## Meeting #3

### Where We Want to Go “Long-Term”

Engage stakeholders in early development of the Integrated Systems Plan (ISP).

# Our Objectives for Meeting #2

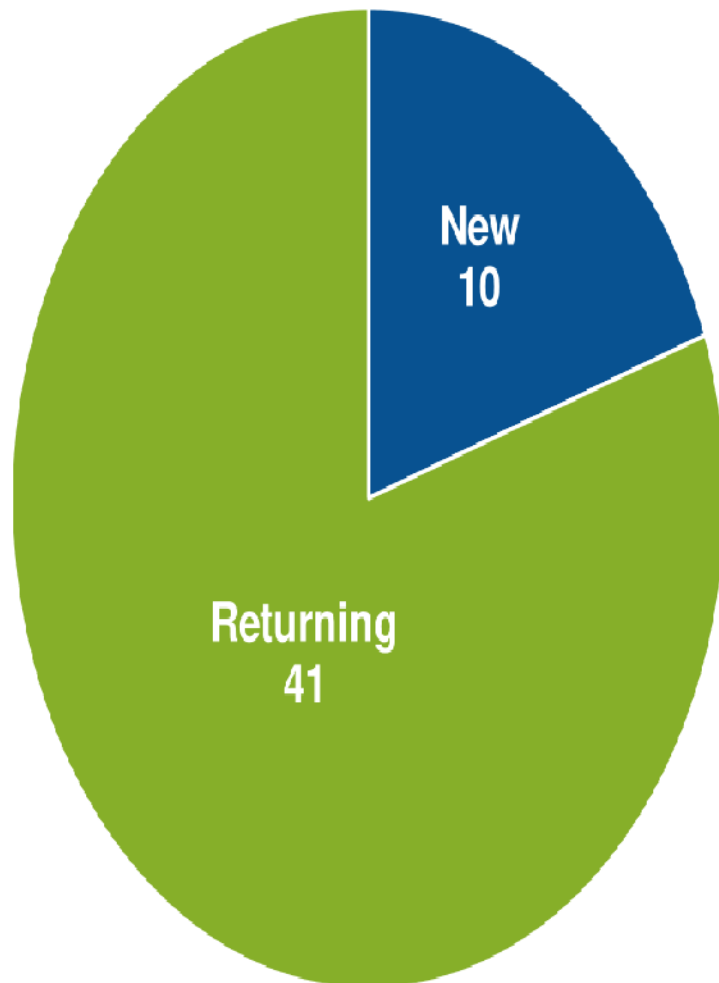
- **Provide opportunities for stakeholder to engage in Q&A related to SRP's near-term planning efforts.**
- **Collect community stakeholder perspectives on SRP's near-term planning efforts to ensure that important considerations are not missed.**
- **Increase SRP's understanding of stakeholder's topical interests to inform the stakeholder engagement program for the longer-term ISP.**

# ISP Summer Series Stakeholders

1. AARP
2. AEPCO
3. AES
4. Air Products
5. Amazon
6. AMPUA
7. AMWUA
8. Apache County
9. Apache Junction
10. Apex Clean Energy
11. Apple Inc
12. APS
13. Arizona Cattle Growers Association
14. Arizona Center for Law in the Public Interest
15. Arizona Chamber of Commerce
16. Arizona Commerce Authority
17. Arizona Competitive Power Alliance
18. Arizona Cotton Growers Association
19. Arizona Energy Policy Group
20. Arizona Farm Bureau
21. Arizona Hispanic Chamber of Commerce
22. Arizona Lodging and Tourism Association
23. Arizona Power Authority
24. Arizona Residential Utility Consumer Office
25. Arizona Solar Deployment Alliance
26. Arizona Solar Energy Industries Association
27. Arizona State Land Department
28. ASU
29. Avangrid Renewables (Iberdrola)
30. AZ Thrives
31. AZ PIRG
32. AZ Strategies
33. AZ Sustainability Alliance
34. Basha's
35. Beatitudes Campus
36. Boeing
37. Bureau of Land Management
38. Casa Grande
39. Candela Renewables
40. Chandler
41. Chicanos Por La Causa
42. City of Mesa
43. City of Phoenix
44. City of Tempe
45. CMC Steel
46. Coolidge
47. Copper State Consulting Group
48. Cushman & Wakefield
49. Cyrus One
50. Digital Realty
51. DMB
52. East Valley Chamber of Commerce
53. East Valley Partnership
54. Environment America
55. Environmental Defense Fund
56. EPRI
57. First Solar
58. Florence
59. Forest Service U.S. Department of Agriculture
60. Fort McDowell Yavapai Nation
61. Freeport McMoRan Copper and Gold
62. Gamage & Burnham Attorneys at Law
63. General Electric
64. Gila Bend
65. Gilbert
66. Glendale
67. Google
68. Greater Phoenix Economic Council
69. Greater Phoenix Leadership
70. Greenlots
71. Home Builders Association of Central Arizona
72. Intel
73. Interwest Energy Alliance
74. Leeward Energy
75. Local First Arizona
76. Kyl Center for Water Policy
77. Mercy Gilbert Medical Center/Dignity Health
78. Mitsubishi Hitachi Power Systems Americas, Inc.
79. NAU
80. Navajo County
81. New Leaf/ Mesa-CAN
82. NextEra Energy Resources
83. NREL
84. Page
85. Phoenix Chamber of Commerce
86. Pinal County
87. Queen Creek
88. Roosevelt Water Conservation District
89. Salt River Pima-Maricopa Indian Community
90. Scottsdale
91. Scottsdale School District
92. Seguro Energy
93. Sierra Club
94. Southwest Energy Efficiency Project
95. SRP Customer Utility Panel (CUP)
96. St. Johns
97. Strata Solar
98. Sustainable Energy Power Alliance
99. TEP
100. The Nature Conservancy
101. U of A
102. United Dairymen of Arizona
103. Valle Del Sol Strategic Initiatives; The Real Arizona Coalition
104. Valley Partnership
105. Walmart
106. West Marc
107. Western Grid Group
108. Western Resource Advocates
109. WildFire

# Community Stakeholder Participation

## Meeting #1 Returning & New Stakeholder



## Stakeholder Interests





# Agenda

Time		Topics	Presenter
10:00 – 10:10	10 mins	Welcome and Opening Remarks	Kelly Barr
10:10 – 10:15	5 mins	Agenda Overview and Participation Opportunities	Kearns & West
10:15 – 11:15	60 mins	Introduction to Near-Term-Planning and Q&A	Angie Bond-Simpson and SRP Subject Matter Experts
11:15 – 11:20	5 mins	Polling and Breakout Room Process Overview	Kearns & West
11:20 – 11:40	20 mins	Breakout Discussions	Facilitated by Kearns & West
11:40 – 11:45	5 mins	E3 Introduction and Announcements	Facilitated by Kearns & West
11:45 – 11:55	10 mins	Breakout Discussion Reports	Facilitated by Kearns & West
11:55 – 12:00	5 mins	Wrap-up/Conclusion	Angie Bond-Simpson

# Opportunities for Participating Today

- Q&A session
- Polling
- Breakout room discussions



# Guides for Productive Virtual Meetings

- Actively participate
- Be respectful of other perspectives
- Listen for understanding
- Stay concise to allow time for everyone to participate
- Enjoy the meeting!

# Near-Term Planning Discussion

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)

# What Does Near-Term Mean?

**IRP Strategic  
Directions  
2018-2024**

**Near-Term Needs  
2021-2024**

**Integrated System  
Plan  
2025-2035**

Near-term needs are those that must be planned for prior to the finalization of the ISP in 2022.

- Driven by load growth and resource adequacy needs
- Primarily resource focused
- Held constant throughout analysis in development of the ISP



# Today's Purpose- Transparency

1. SRP must add resources to be online and operating by 2024.
2. Continue “And” approach to adding resources: **Solar, Storage, Customer Programs** and **Natural Gas**.
3. These resources, along with SRP's existing portfolio, must uphold SRP's commitments including 2035/2050 Sustainability Goals and core planning principles.
4. These resources will be a piece of the overall need to 2035, which is the focus of the ISP.

# Strong Economic Growth Ahead

Maricopa is the #1 fastest growing county in the U.S .

Phoenix leads pre-pandemic job recovery: 97% through June 2021

The Southwest is becoming America's advanced manufacturing hub.

Housing permits are at the highest since mid-2000's: Over 100 every day.

# SRP Mission Considerations for Near-Term Growth

## Maintaining Reliability

Technology maturity  
Timely development  
Available when needed



## Sustainability Commitments

Carbon  
Water



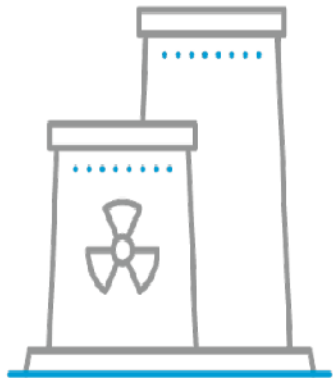
## Affordability

Cost stability  
Investment longevity  
Lowest quartile prices regionally

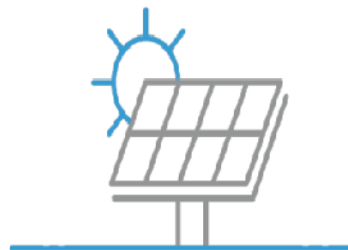
# Meeting Near-Term Growth with “AND”

Serving SRP’s growing customer demand reliably will require resource additions.

We have a good foundation:



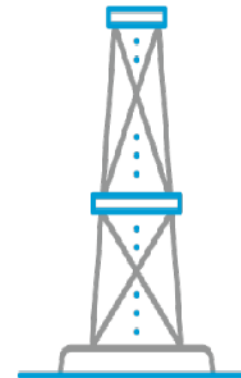
Palo Verde Nuclear  
+114 MW by 2024



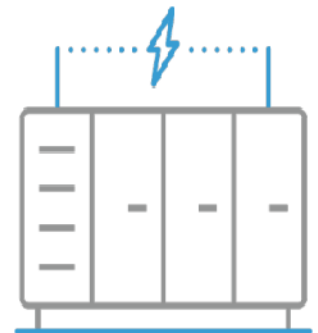
Solar Additions  
+2025 MW by 2025



Demand Response  
150 MW by 2022

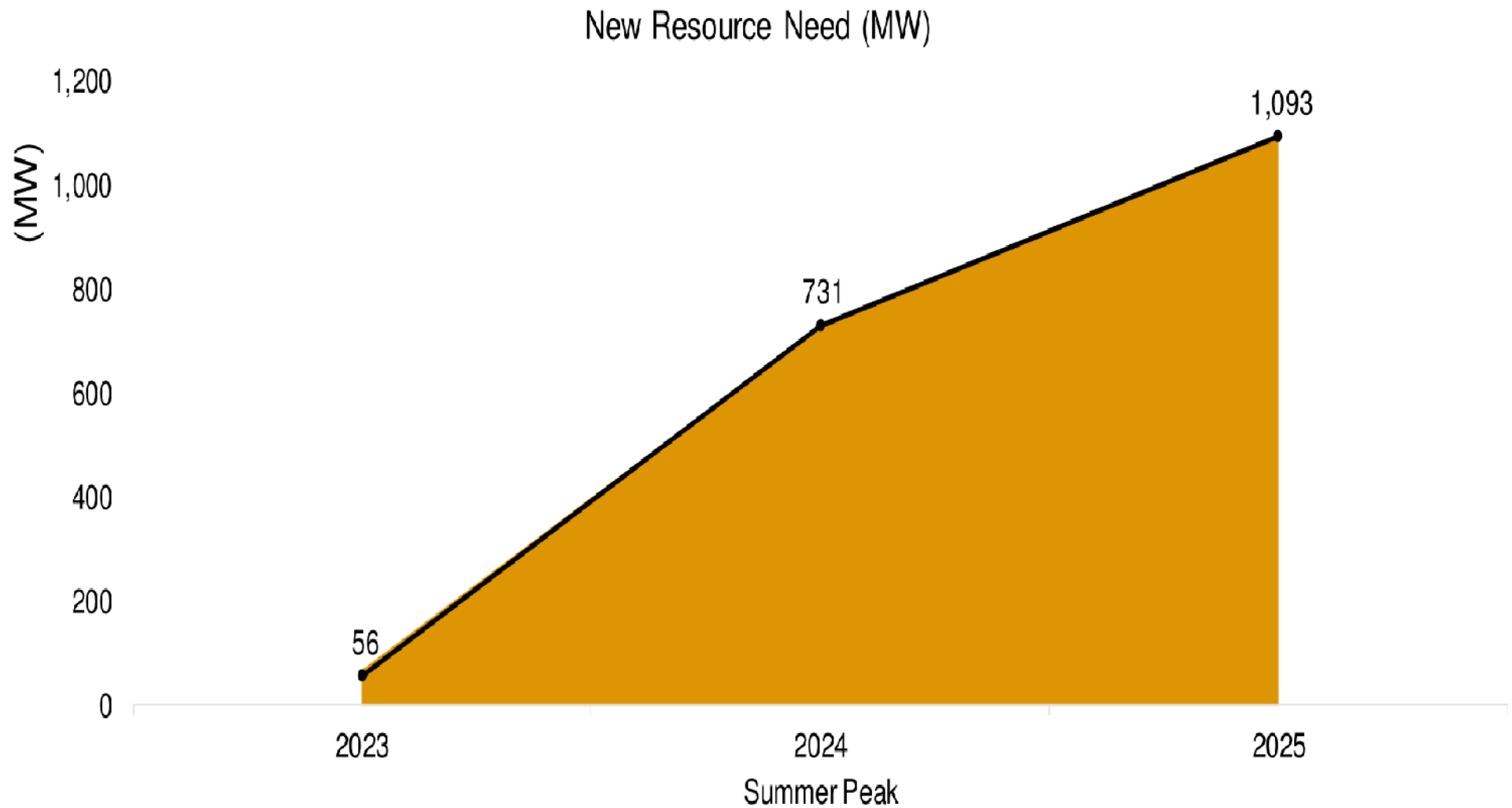


Near-term Peakers  
+176 MW by 2022



Battery Storage  
+372 MW by 2023

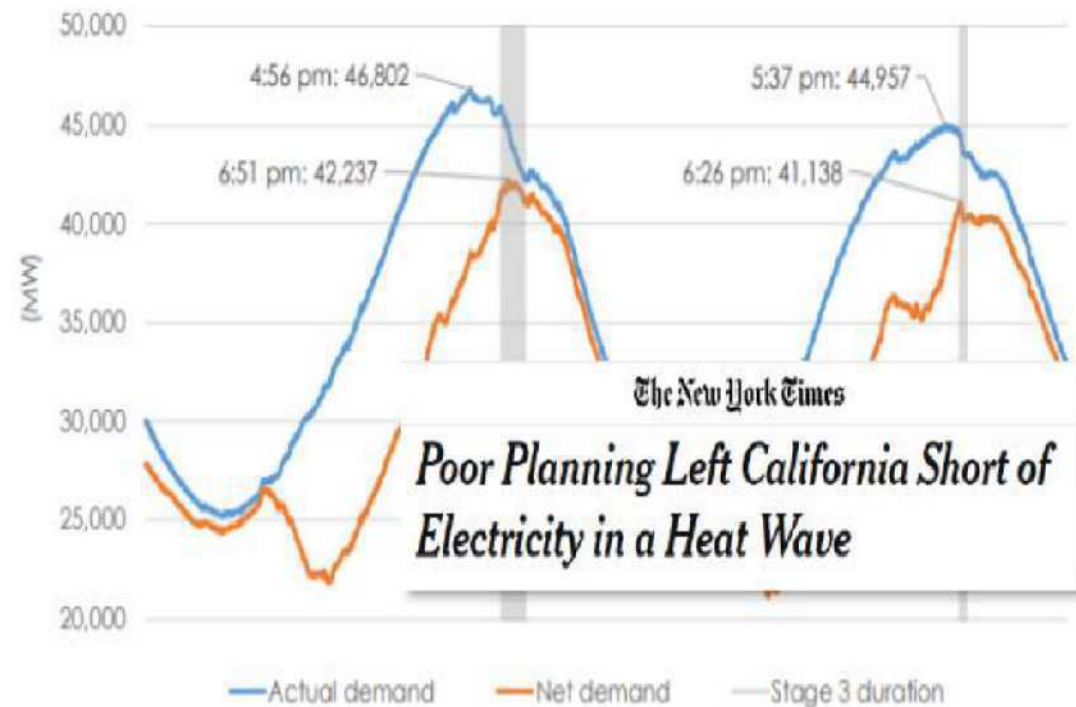
# Extraordinary Near-Term Growth





# Planning for Reliability

- Ample supply available to meet demand
- All conditions – not just average
- Firm resources with sustained output have the highest reliability value.



Source: <http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf>

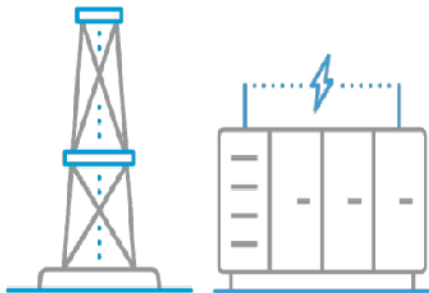
# Maintaining Reliability with a Cleaner Grid



- Retirement of traditional **firm** resources



- Rapid growth of **intermittent** renewables



- Regional risk
- Climate change

# Continue the “AND” Approach for Near-Term Need

Resources considered for the near-term:



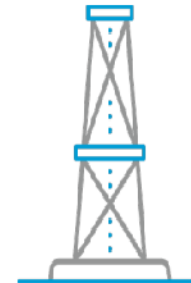
**Existing Third-Party Assets**  
Carbon-free or low carbon



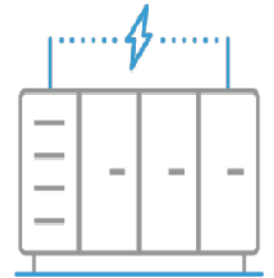
**Solar**



**Customer Programs**



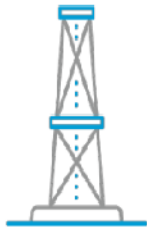
**Quick Start Gas**



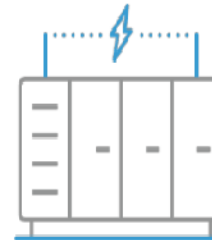
**Battery Storage**

# Near-Term Planning - Using the Right Tool for the Right Job

## Firm



## Intermittent & Limited Duration

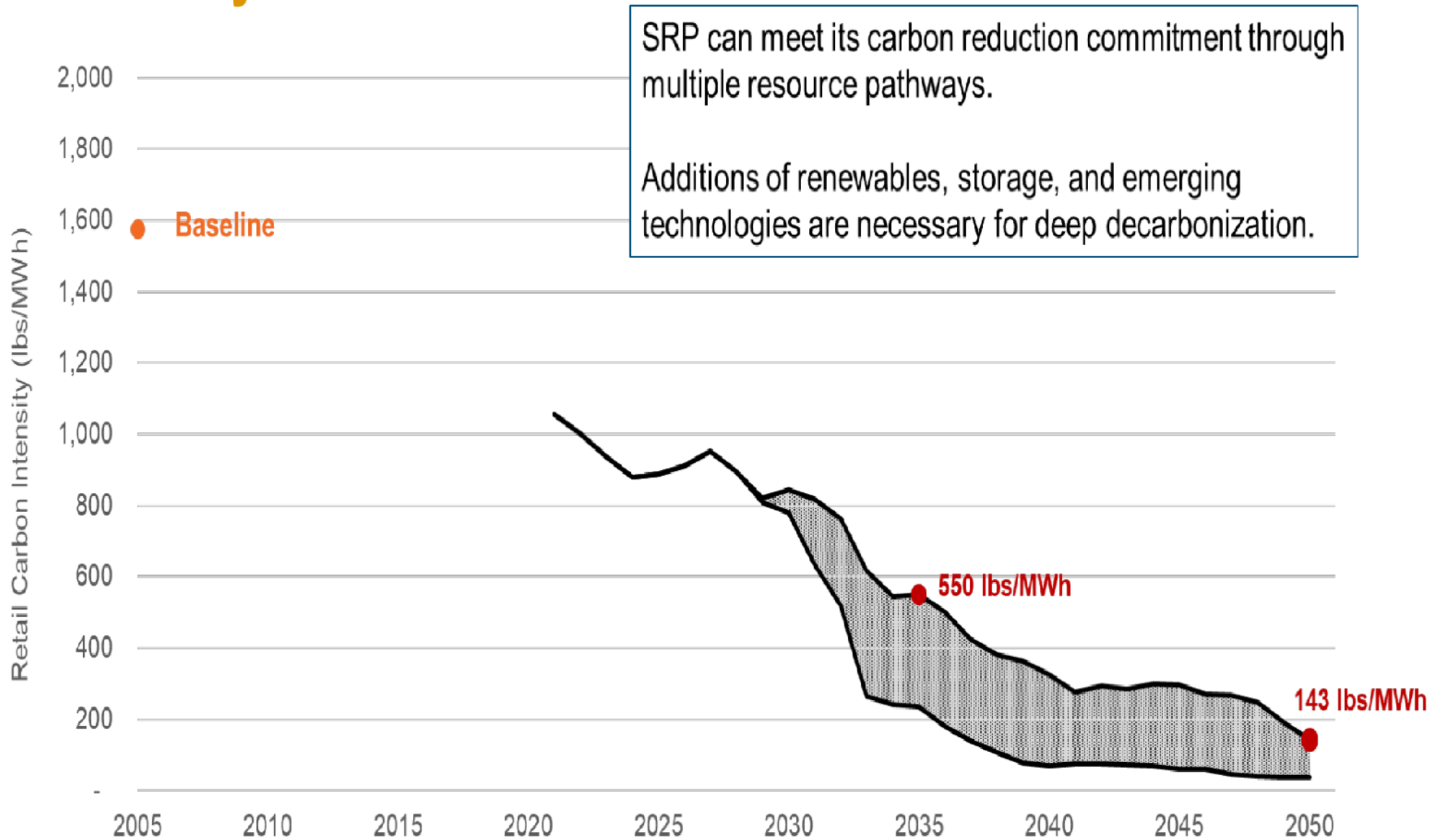


- Provides reliable capacity in all seasons and over long durations
- Flexibility to address intermittent resource ramping
- Fast response during emergency events
- Carbon-free alternatives
- Developing technologies
- Decreasing costs
- Can be cheaper during daytime hours

In the near-term, **integration** of both types of resources will provide value to customers in terms of reliability, affordability, sustainability.

# SRP Carbon Commitment

## Intensity Based





# Establish Gas “Reliability Backbone” Next

## Quick Start Gas Reliability Backbone:

- Meets critical demand conditions
- Backs up intermittent renewables and limited duration storage
- Capable of transitioning to hydrogen

### Sustainability Commitments

- ✓ Low Carbon
- ✓ Low Water Use

### Reliability Need

- ✓ Quick Start
- ✓ Firm and Flexible

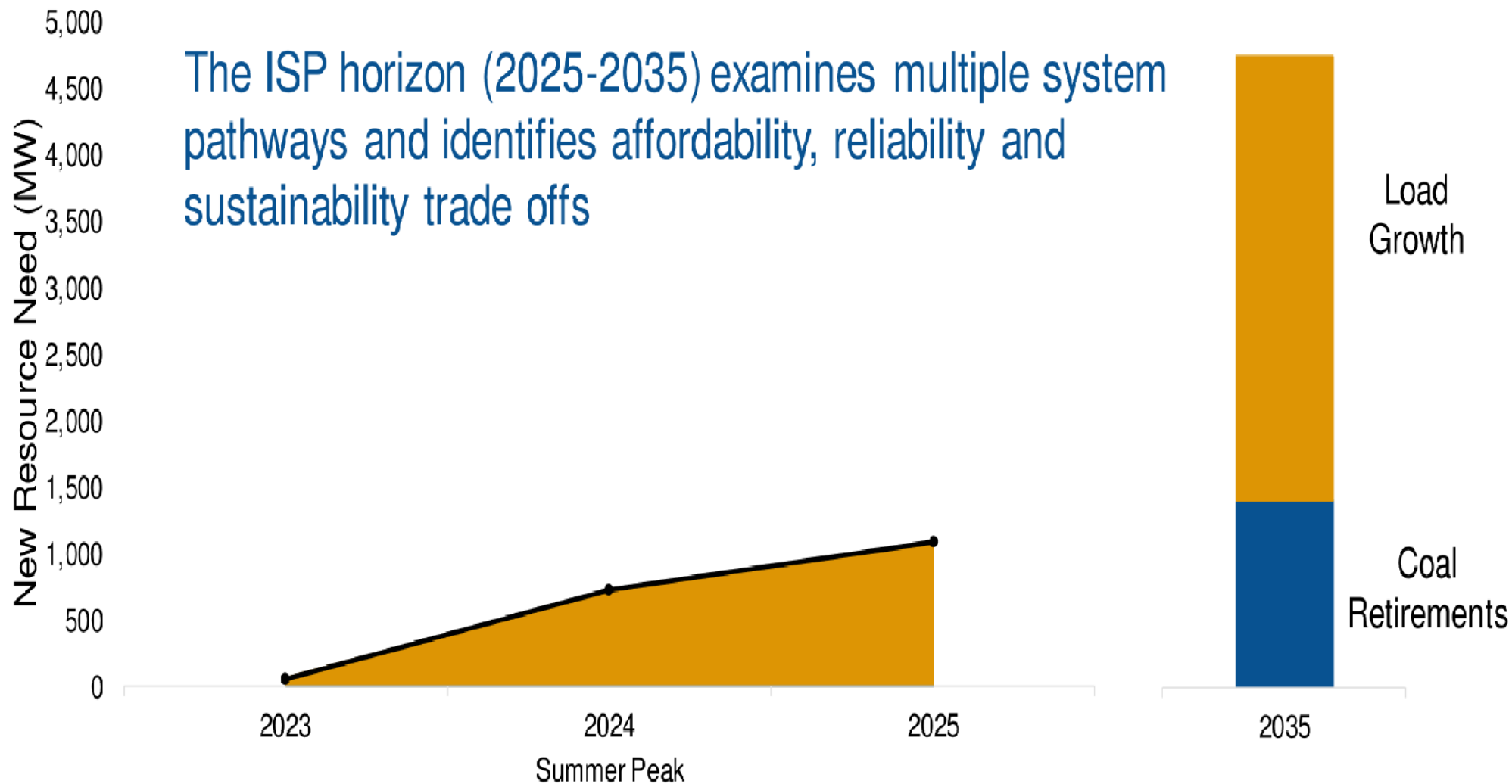
### Affordability

- ✓ Mature and Versatile

# Key Takeaways for Near-Term Planning

- SRP must plan for growth and be mindful of regional risks
- Near-term planning focus:
  - Substantial solar for carbon reductions – 2025 by 2025
  - Integration of industry leading battery storage commitments
  - Firm, flexible gas reliability backbone
- Other technologies will be needed

# Meeting Near-Term Growth is Only a Start



# Q&A

## Join with Raise Hand or Chat

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)  
**And SRP Subject Matter Experts**

# Polling and Breakout Discussion Process Overview

Joan Isaacson, Facilitator  
Kearns & West



# Polling Exercise

## THREE WAYS TO PARTICIPATE



### BY COMPUTER

Go to [pollev.com/kwpoll1](https://pollev.com/kwpoll1)  
on your internet browser.



### BY SMART PHONE

Go to [pollev.com/kwpoll1](https://pollev.com/kwpoll1)  
on your internet browser.



### BY TEXT MESSAGE

Text [kwpoll1](https://pollev.com/kwpoll1) to 22-333 on your  
mobile device.

## From your perspective, what are the most important considerations for SRP's near-term planning efforts? (Please select 2 answers)



# Breakout Discussions

**Joan Isaacson, Facilitator**  
Kearns & West

# Purpose: Listening Session

Collect community stakeholder perspectives on SRP's near-term planning efforts to ensure that important considerations are not missed

Increase SRP's understanding of stakeholder's interests to inform the stakeholder engagement program for the longer-term ISP

We want to hear your perspectives!  
**Raise Hand** and unmute to join the conversation or type your perspectives in **Chat**

# E3 Introduction August Meeting Overview

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)



- + Founded in 1989, E3 is a leading consultancy in the electric power sector – offices in San Francisco, Boston, New York, and Calgary
- + E3 consults extensively for utilities, developers, government agencies, and environmental groups on clean energy issues
- + Our experts provide critical thought leadership, publishing regularly in peer reviewed journals and leading industry publications
- + We have conducted deep decarbonization and clean energy analysis across the U.S. for many clients, including:
  - **US wide:** United Nations
  - **California:** CPUC, CEC, SMUD, LADWP, The Nature Conservancy, Environmental Defense Fund
  - **Southwest:** SRP, APS, NVE, PNM, EPE
  - **Colorado:** Governor's Energy Office
  - **Hawaii:** HECO
  - **Pacific Northwest:** numerous utilities
  - **New York:** NYSERDA, NYPA
  - **New England:** Maine Governor's Energy Office, Calpine
  - **PJM:** Electric Power Supply Association
  - **Upper Midwest:** Xcel Energy







# Integrated System Plan: Summer Series Informational Portal

**Angie Bond Simpson**, Director  
Integrated System Planning & Support (SRP)

# Integrated System Plan: Summer Series:

## [srpnet.com/about/integrated-system-plan.aspx](http://srpnet.com/about/integrated-system-plan.aspx)



 My Account
  Pay Bill
  Outages

[MY ACCOUNT](#)
[RESIDENTIAL ELECTRIC](#)
[BUSINESS ELECTRIC](#)
[WATER](#)
[SAVINGS AND REBATES](#)
[ABOUT US](#)
[CONTACT US](#)

## Integrated System Plan: Summer Series

The electric power industry is undergoing a dramatic transformation fueled by changing customer expectations and desires, technological innovations and a focus on the environment.

To enable the achievement of SRP's 2035 Corporate Goals, SRP will begin transitioning from a traditional Integrated Resource Plan (IRP) to a more holistic and comprehensive Integrated System Plan (ISP).

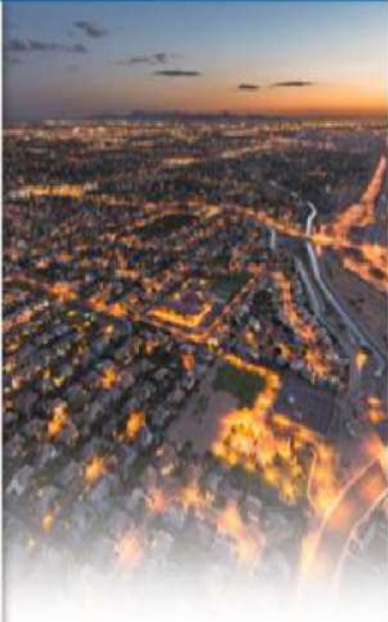
Our new ISP will serve as a system-wide plan to keep SRP on the forefront of evolving technology and customer expectations.

### This new Integrated System Plan:

- Collaboratively integrates all internal planning functions for generation, transmission, distribution and customer-sided resources
- Adapts to evolving industry demands and enhances long-term resource value for our customers and communities
- Addresses energy challenges through the lenses of sustainability, reliability and affordability
- Creates inclusive opportunities for active external stakeholder engagement

### Engaging our stakeholders along the way

This summer, SRP is hosting an ISP Summer Stakeholder Series to update, educate and engage with external community stakeholders regarding the ISP transition. Working alongside communities is how SRP has helped to successfully grow the Valley. This transition is no different. Working with you through this transition is essential as we chart the course to a successful ISP.



### ISP Stakeholder Engagement Opportunities

2021						2022					
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>ISP Summer Stakeholder Series</b>											
Meeting #1: "Since We Last Met" • June 16											
Meeting #2: "Near Term Planning" • July 22											
Meeting #3: "Where We Want to Go" • August 18											
<b>ISP Analytical Roadmap Stakeholder Meetings</b>											
<b>ISP Stakeholder &amp; Board Engagement</b>											
Publish ISP Recommendation •											
First Stakeholder Meeting •											
Publish ISP •											

### ISP Summer Series Meeting 1: "Since We Last Met"

June 16, 2021, 9:30–11:30 a.m. (PST)

In this webinar, we will provide an update on actions taken in accordance with Strategic Resource Directions from the 2017-2018 Integrated Resource Plan.

#### Overview of Topics

- 2017-2018 Integrated Resource Plan Refresh
- 2017-2018 Integrated Resource Plan Strategic Direction Progress
- System Planning Foundations (Distribution, Transmission and Load Growth)

#### Webinar 1 Documents

- [Meeting 1 Pre-read material](#)
- [Meeting 1 Agenda](#)
- [Meeting 1 Presentation](#)

# Report Back on Breakout Rooms

Kearns & West



# What We Heard Today



**From your perspective,  
what are the most  
important considerations  
for SRP's near-term  
planning efforts?**

# Wrap-up

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)



**thank you!**

## Attachment G

# SRP Summer Stakeholder Series – Where We Want to Go

August 16th, 2021

# Welcome

Kelly Barr

Associate General Manager Chief Strategy and Corporate Services & Sustainability Executive

# safety minute

# Water Safety

## **A** Adult Supervision

Designate a “Water Watcher” to watch children at all times. Remember, children drown in more locations than just pools, such as bathtubs, buckets, canals and other bodies of water.

## **B** Barriers

Barriers include pool fences with self-closing and latching gates. Place locks on openings such as doors, windows, pet doors and pool covers.

## **C** Classes

Take swimming lessons and learn CPR. For swimming lessons, call your local city aquatics or swim schools. For CPR certification, call your local fire department. To view and order your free CPR awareness video, visit us at [srpnet.com/safety](http://srpnet.com/safety).



# sustainability minute

# Energy Efficient Pool Equipment

- Variable-speed pool pump
  - Up to 90% more efficient than standard one-speed pumps
- Pool lights
  - Replace your current pool lights with LEDs
- Solar pool cover/blanket
  - Reduces water evaporation by up to 50%

# Welcome SRP Board and Council Observers



**John Hoopes**  
SRP Vice President



**Randy Miller**  
SRP Board Member



**Anda McAfee**  
SRP Board Member



**Jack White**  
SRP Board Member



**Larry Rovey**  
SRP Board Member



**Suzanne Naylor**  
SRP Council Member



**Rocky Shelton**  
SRP Council Member

# Agenda

Time		Topics	Presenter
8:30 – 8:40	10 mins	Welcome and Opening Remarks	Kelly Barr
8:40 – 8:45	5 mins	Agenda Overview and Participation Opportunities	Kearns & West
8:45 – 9:45	60 mins	IRP to ISP Transition Topics, Stakeholder Engagement and <b>Q&amp;A</b>	Angie Bond-Simpson and SRP Subject Matter Experts
9:45 – 9:55	10 min	Next Meeting Preview	Grant Smedley
9:55 – 10:00	5 min	Next Steps	Angie Bond-Simpson





# July Meeting Feedback:

## Overall Meeting Experience?

- The time spent, logistics, overall understanding and pre-read material were all beneficial with insignificant disagreement.

## Further information needed to understand SRP's near-term planning strategy

- Customer program **incentives** and **affordability impacts**
- **Links between near-term and long-term planning**
- Further clarification on **transmission constraints**

## Strengths & Risks of SRP Near-Term Planning Efforts

- Strengths: **Collaboration & Balance**
- Risks: **Fossil Fuels & Market Growth/Volatility**

## What could SRP do more of, better, or differently?

- Stakeholder meeting **feedback focused**



# Summer Series and Meeting #3 Overview

**Joan Isaacson, Facilitator**  
Kearns & West

# ISP Summer Series Overview

## Meeting #1

### Since We Last Met

Update on 2017-18 IRP Strategic Resource Directions progress.

## Meeting #2

### Near Term Planning

Educate on forces of change affecting the industry and near-term planning.  
Collect perspectives from stakeholders.

## Meeting #3

### Where We Want to Go “Long-Term”

Engage stakeholders in early development of the ISP.

**\*Additional Meeting “Near-Term Planning: Part 2” to discuss next resource decision in SRP’s near-term plan**

**Date:** August 23rd, 2021

**Time:** 10:00AM-11:30AM (PST)

# Our Objectives for Meeting #3

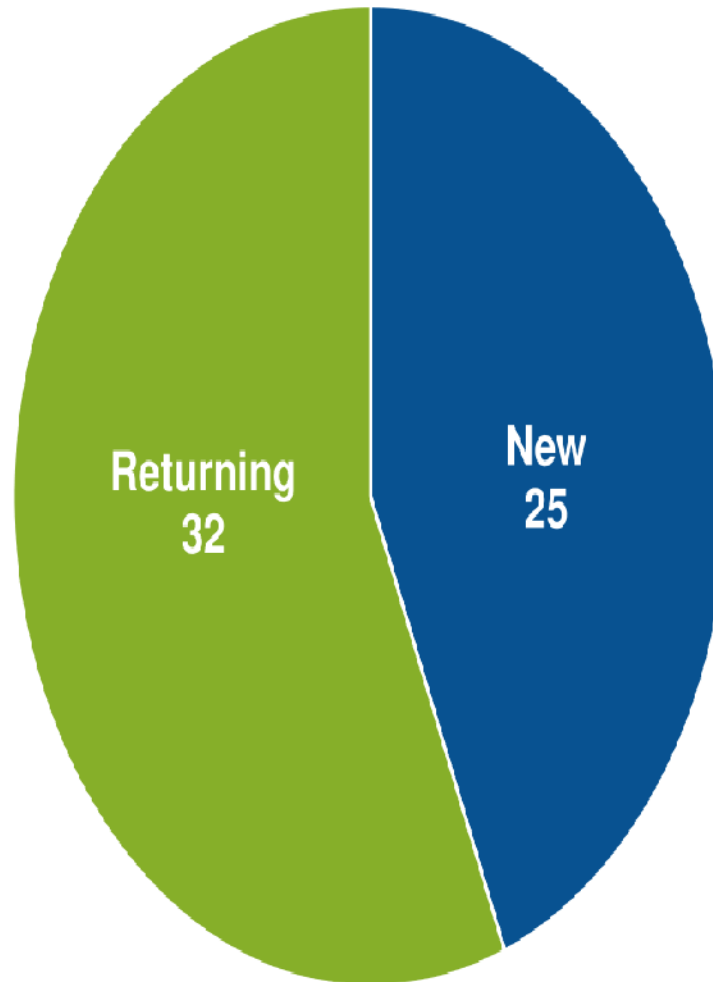
- **Address stakeholders' feedback and questions from Meeting #2**
- **Increase SRP's understanding of stakeholders' interests to inform the stakeholder engagement program for the longer-term ISP.**

# ISP Summer Series Stakeholders

1. AARP
2. AEPCO
3. AES
4. Air Products
5. Amazon
6. AMPUA
7. AMWUA
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9. Apache Junction
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14. Arizona Center for Law in the Public Interest
15. Arizona Chamber of Commerce
16. Arizona Commerce Authority
17. Arizona Competitive Power Alliance
18. Arizona Cotton Growers Association
19. Arizona Energy Policy Group
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21. Arizona Hispanic Chamber of Commerce
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42. City of Mesa
43. City of Phoenix
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54. Environment America
55. Environmental Defense Fund
56. EPRI
57. First Solar
58. Florence
59. Forest Service U.S. Department of Agriculture
60. Fort McDowell Yavapai Nation
61. Freeport McMoRan Copper and Gold
62. Gamage & Burnham Attorneys at Law
63. General Electric
64. Gila Bend
65. Gilbert
66. Glendale
67. Google
68. Greater Phoenix Economic Council
69. Greater Phoenix Leadership
70. Greenlots
71. Home Builders Association of Central Arizona
72. Intel
73. Interwest Energy Alliance
74. Leeward Energy
75. Local First Arizona
76. Kyl Center for Water Policy
77. Mercy Gilbert Medical Center/Dignity Health
78. Mitsubishi Hitachi Power Systems Americas, Inc.
79. NAU
80. Navajo County
81. New Leaf/ Mesa-CAN
82. NextEra Energy Resources
83. NREL
84. Page
85. Phoenix Chamber of Commerce
86. Pinal County
87. Queen Creek
88. Roosevelt Water Conservation District
89. Salt River Pima-Maricopa Indian Community
90. Scottsdale
91. Scottsdale School District
92. Seguro Energy
93. Sierra Club
94. Southwest Energy Efficiency Project
95. Springerville
96. SRP Customer Utility Panel (CUP)
97. St. Johns
98. Strata Solar
99. Sustainable Energy Power Alliance
100. TEP
101. The Nature Conservancy
102. U of A
103. United Dairymen of Arizona
104. Valle Del Sol Strategic Initiatives: The Real Arizona Coalition
105. Valley Partnership
106. Walmart
107. West Marc
108. Western Grid Group
109. Western Resource Advocates
110. WildFire

# Community Stakeholder Participation

## Meeting #2 Returning Stakeholders



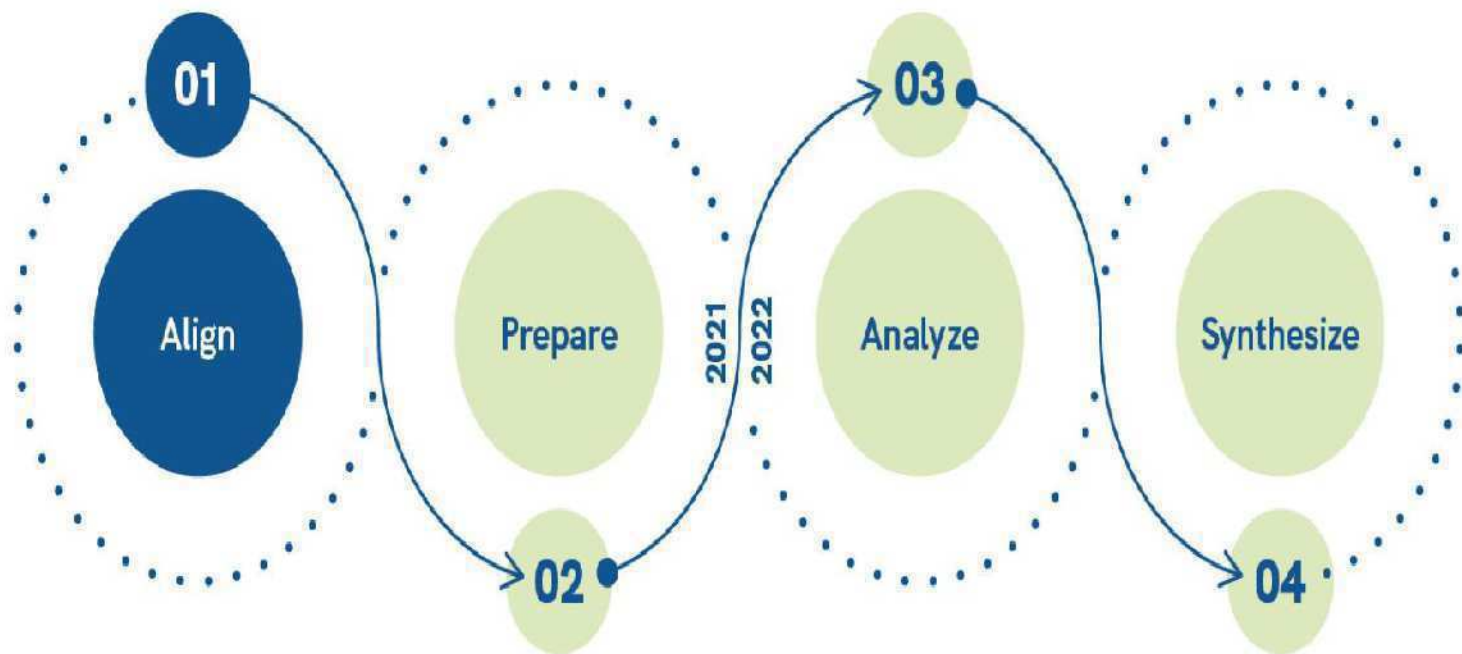
# Guides for Productive Virtual Meetings

- Actively participate
- Be respectful of other perspectives
- Listen for understanding
- Stay concise to allow time for everyone to participate
- Enjoy the meeting



# IRP to ISP Transition Topics

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)



# SRP ISP ROADMAP

## Stakeholder Engagement and Public Outreach

### ISP Summer Series Meeting 1 "Since We Last Met":

Review 2017-18 IRP process and the actions taken since.

### ISP Summer Series Meeting 2 "Near-Term Planning":

Discuss IRP to ISP transition and current planning environment.

### ISP Summer Series Meeting 3 "Near-Term Planning Part 2 / Where We Want to Go":

Address stakeholder feedback to date and inform of upcoming resource decisions. Engage in early development of the ISP.

### ISP Goals

Discuss objectives for the ISP.

### Periodic SRP Elected Officials and Leadership Updates:

Share updates on progress to date.

### ISP Metrics & Scenario Workshops:

Determine measures of success and what to test.

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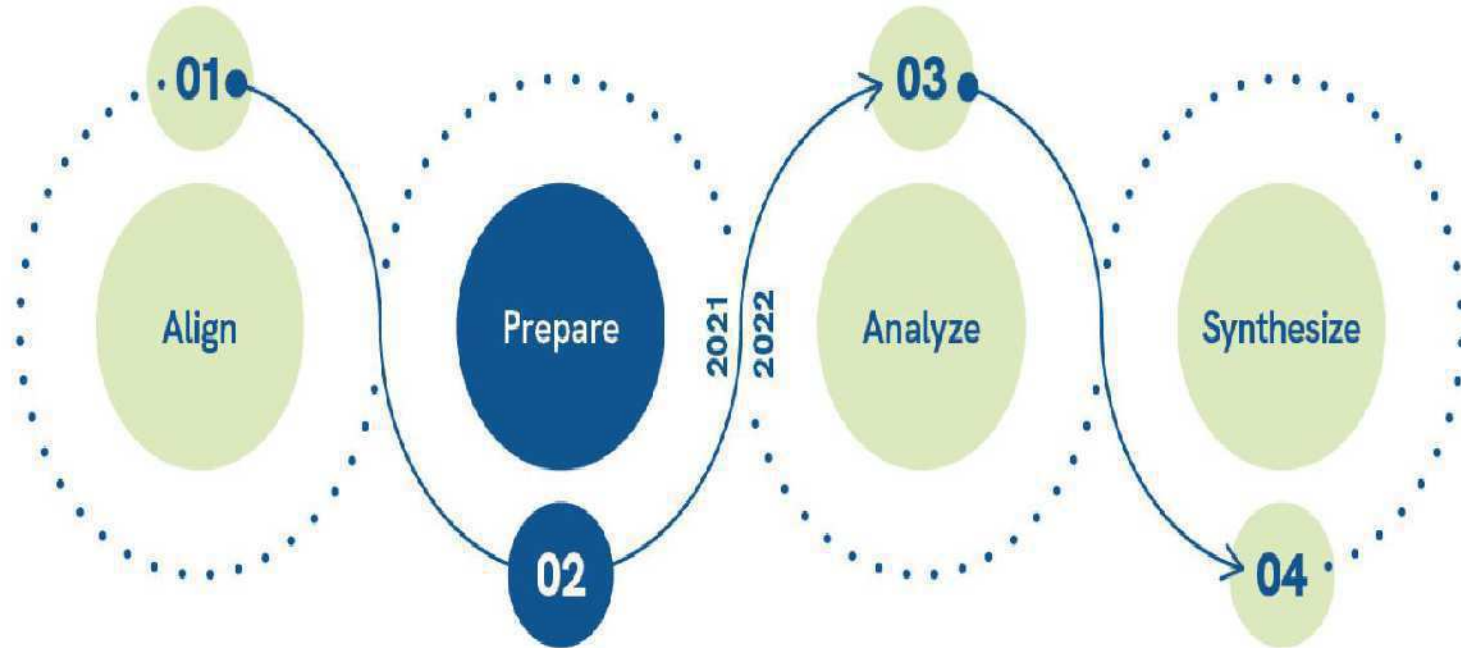
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### ISP Final Results & Recommendations:

Share finalized ISP and next steps.



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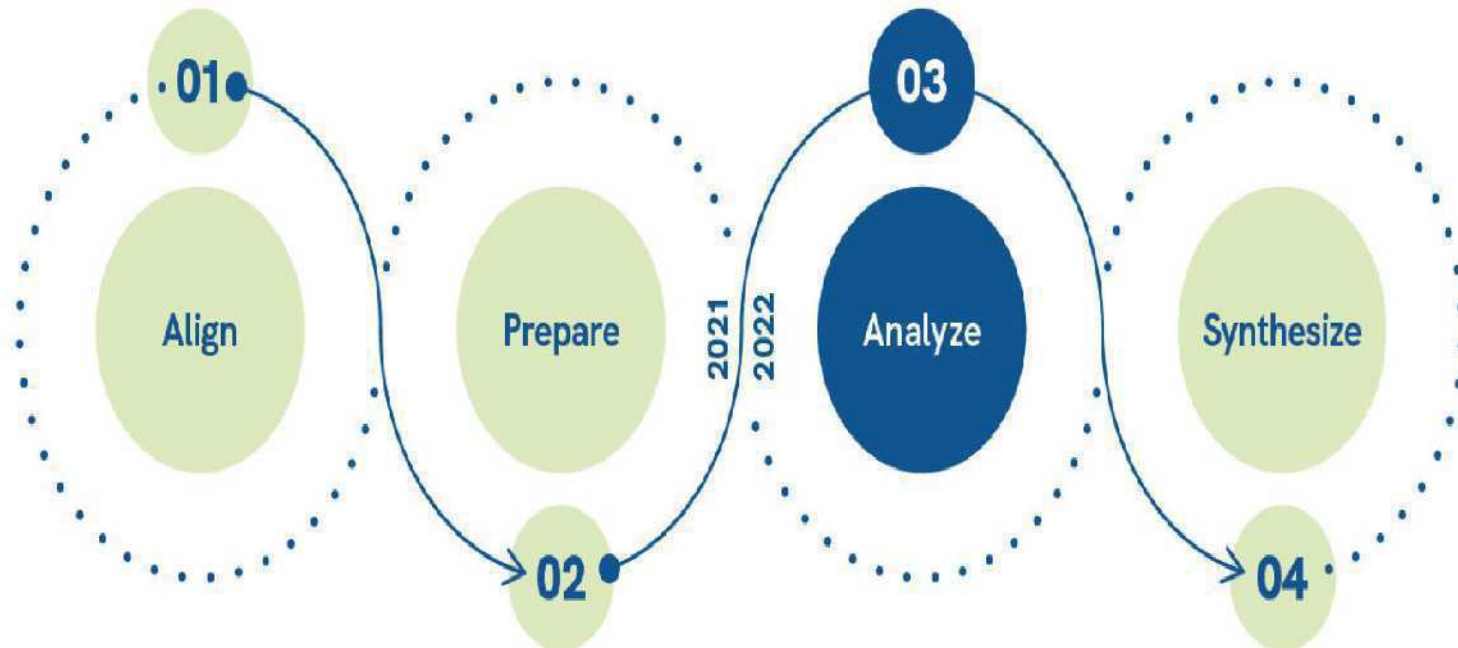
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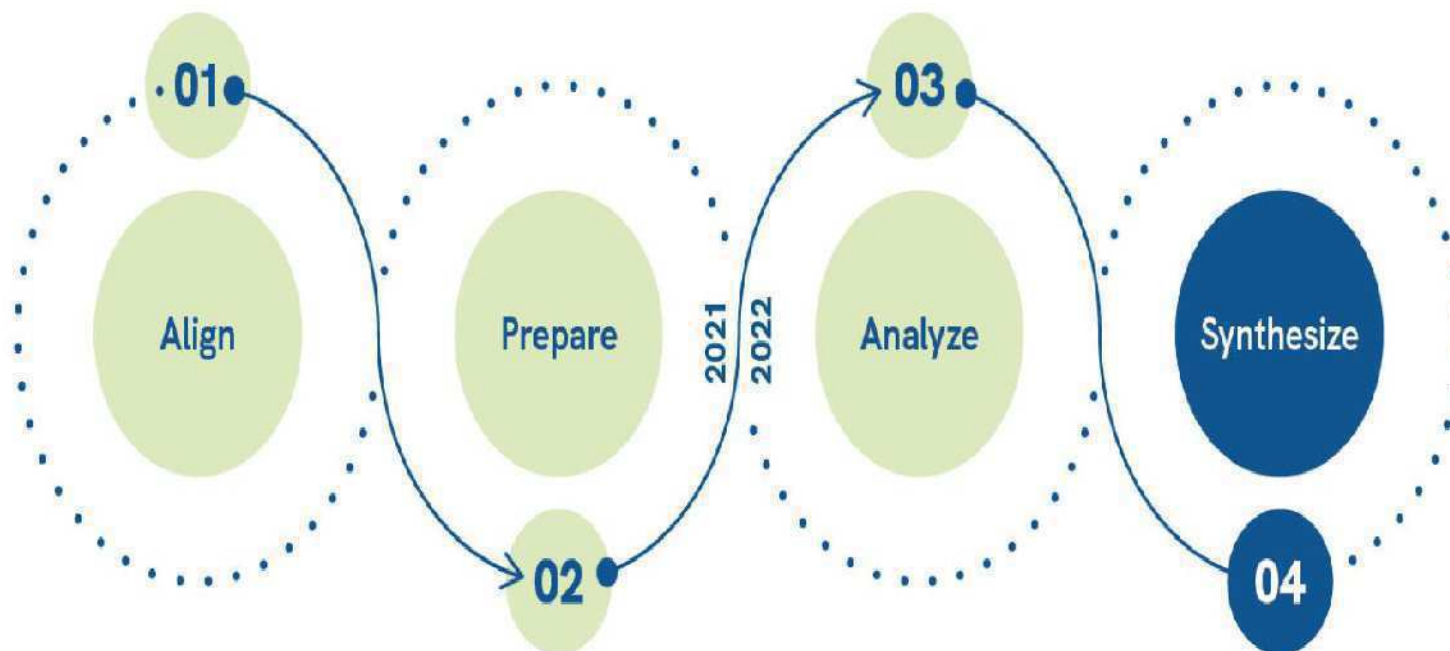
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# ISP Vision

SRP collaboratively plans a future system (2025-2035), achieving or exceeding our 2035 goals, at the best customer value.

## Renewables Support

What fills in the renewable gaps?



## Storage Potential

How can we unlock the potential of energy storage?



## Customer Greenhouse Gas Reduction

How can we empower customers to contribute to greater greenhouse gas reductions?



## Grid Location

Where should resources be located to enhance the grid?



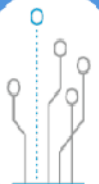
## Two-Way Powerflow Enablement

How can we re-imagine a reliable and equitable grid infrastructure to enable two-way power flow for customers with evolving energy needs?



## New Technology Timing

When is new technology ready to scale safely and reliably?





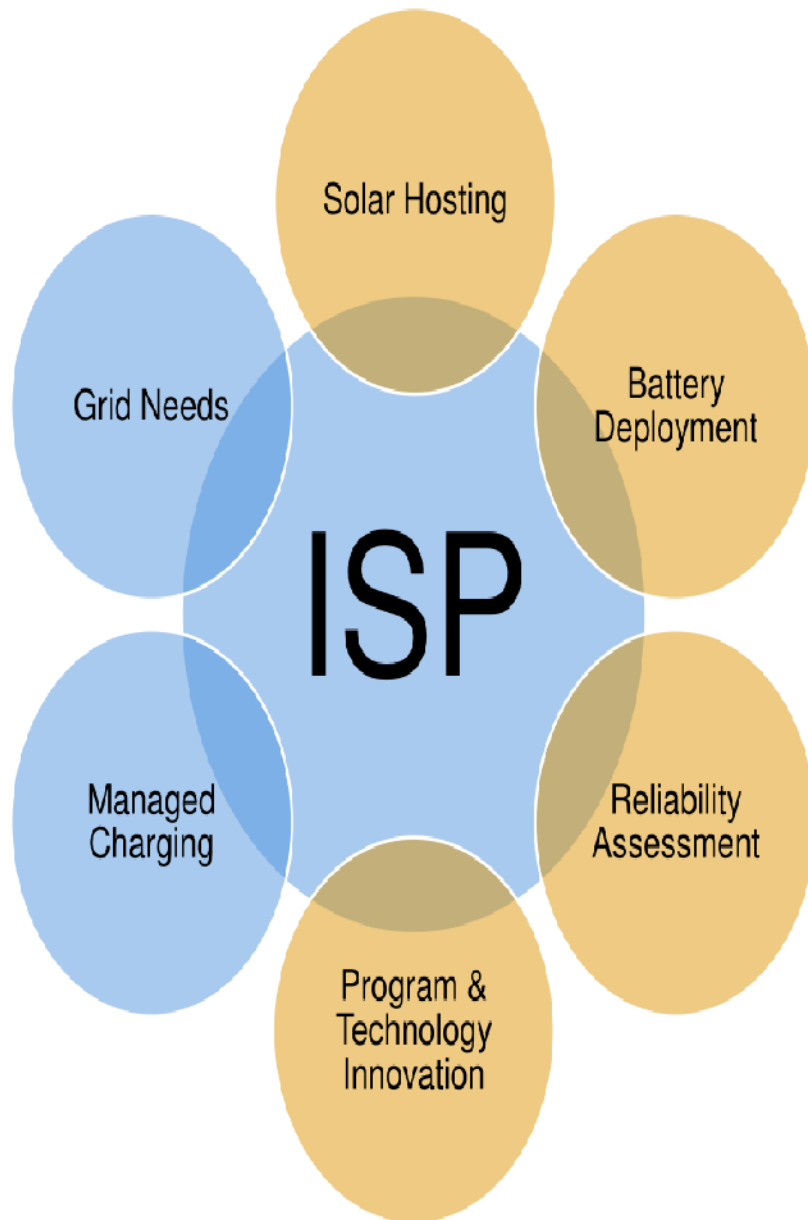
# Analytical Considerations



The vision for the ISP requires

- Technical analysis
- Innovation
- Enhanced coordination

# Analytical Considerations



The results of early system analysis informed near-term decisions.

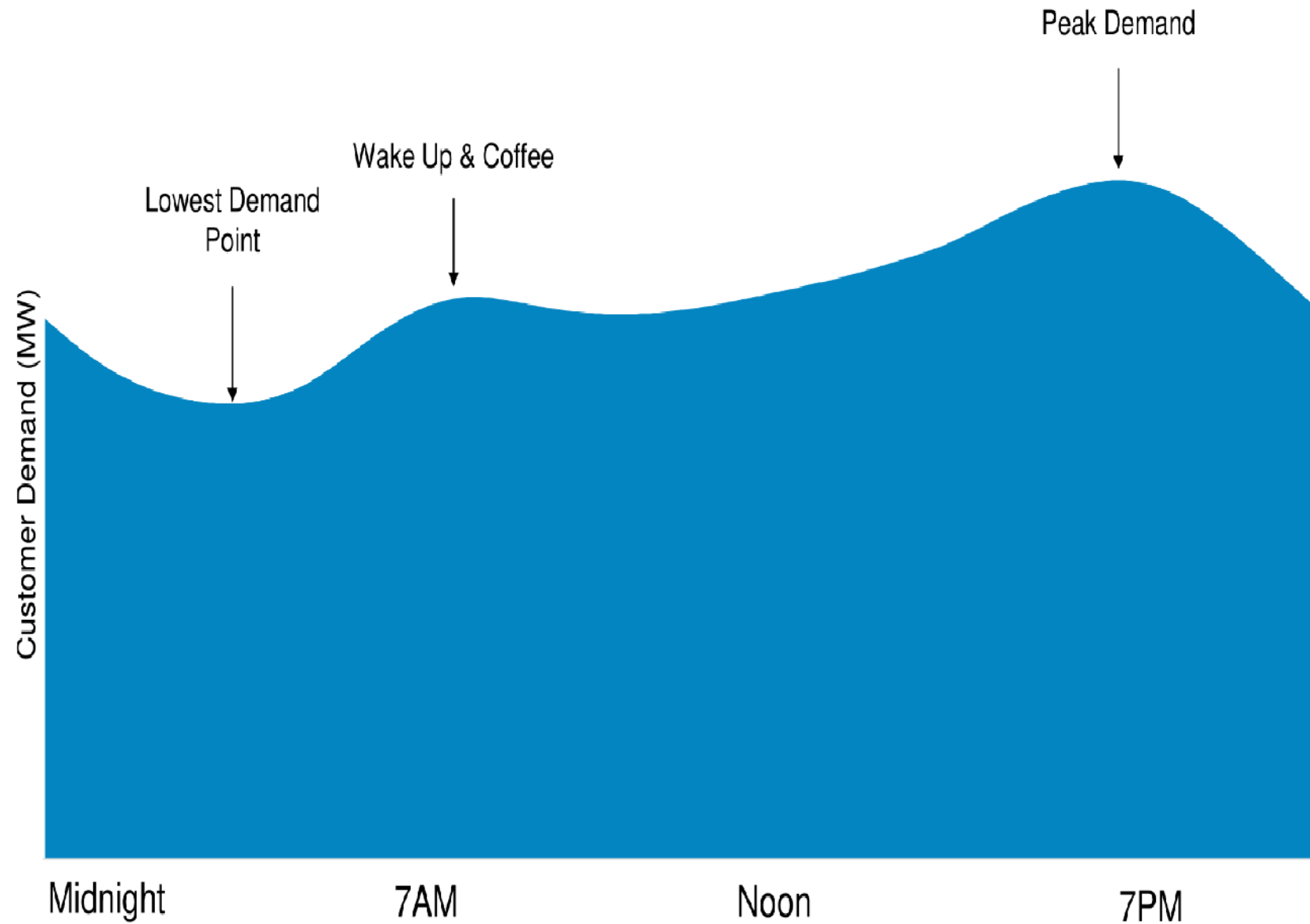
# What is Solar Hosting?

The amount of solar generation that can be reliably placed on SRP's system

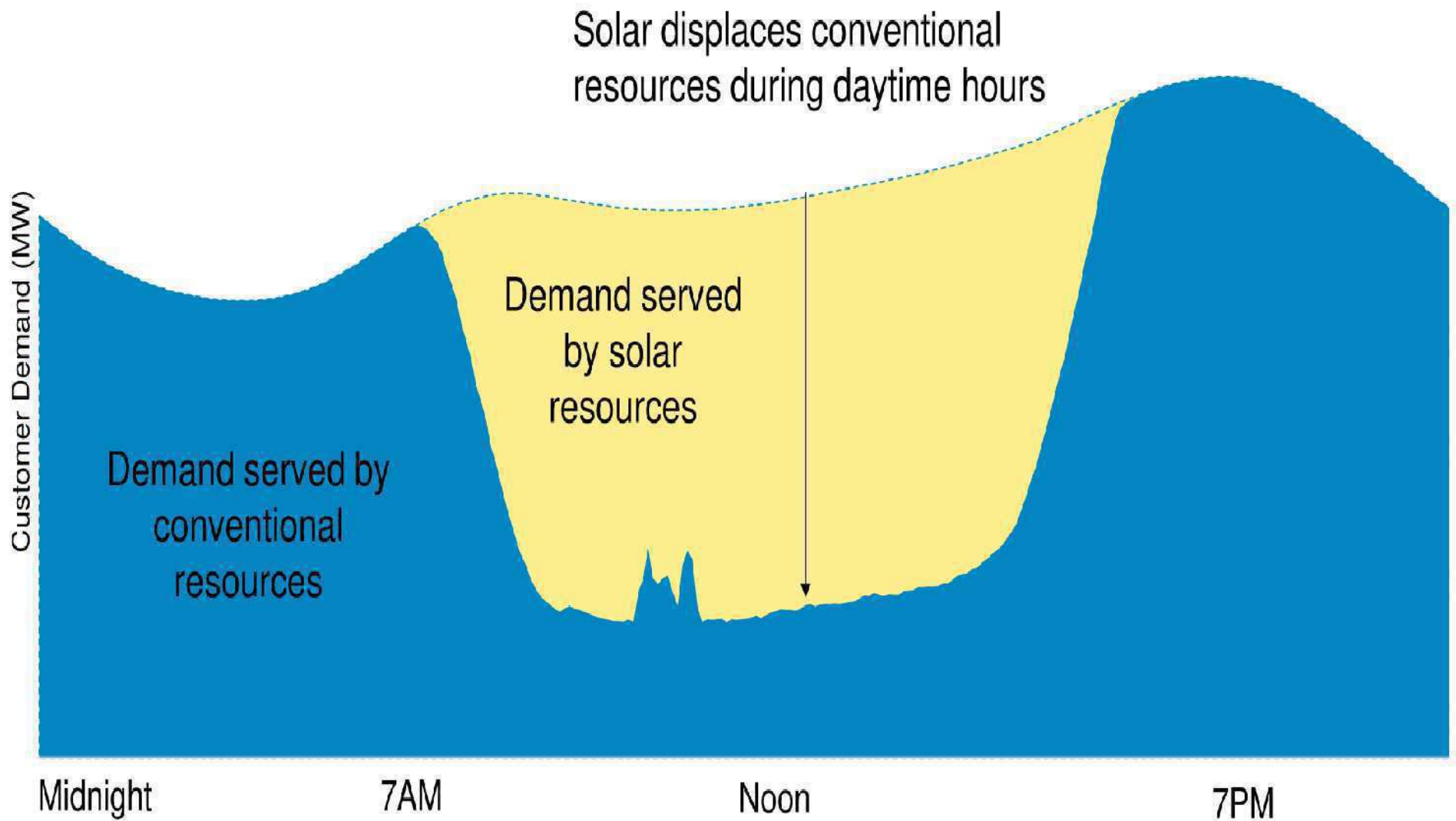
- What does it cost to add more?
- Where should it be located to maximize value for the grid?



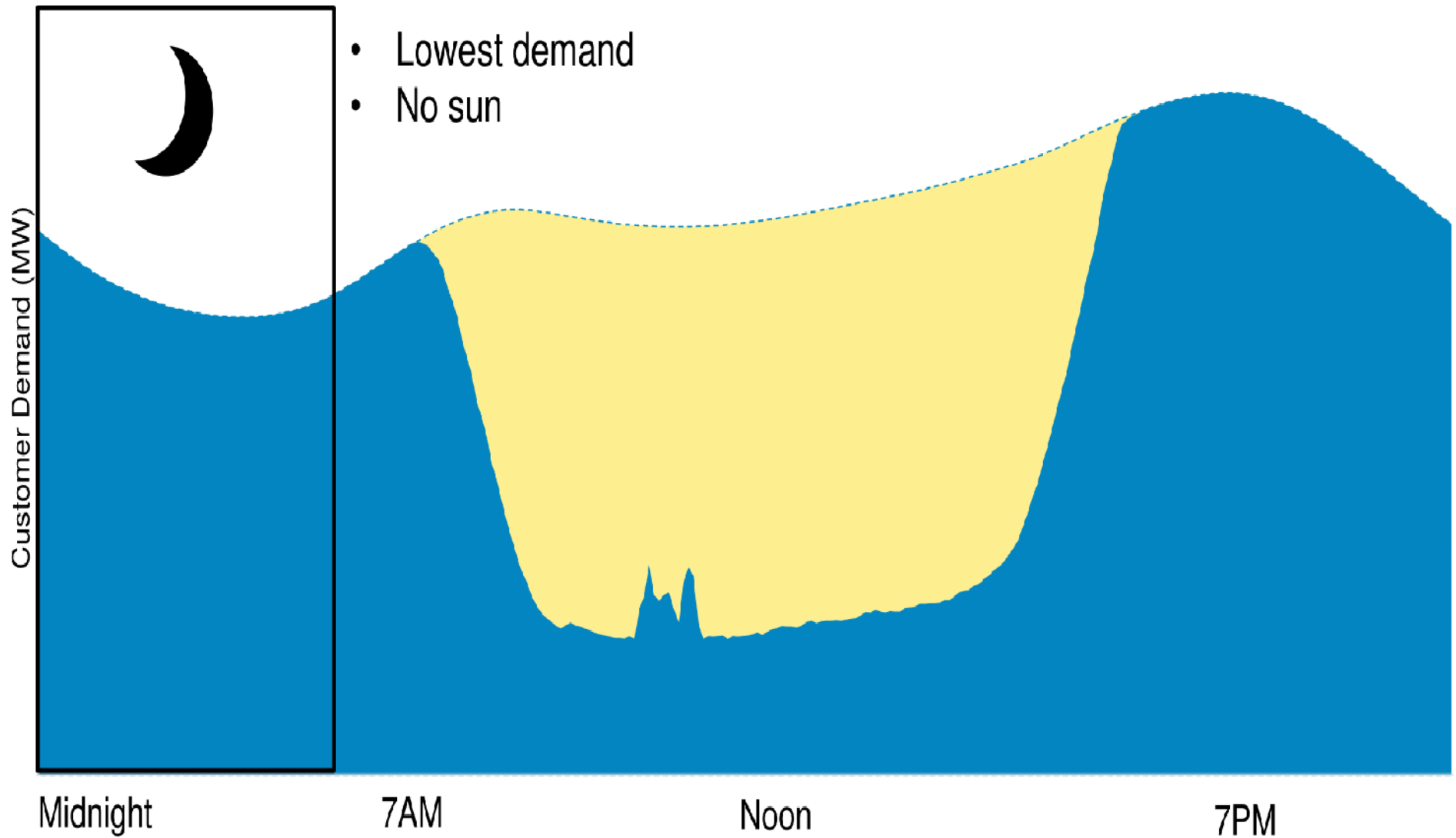
# Meeting Customer Load



# Integrating Substantial Solar

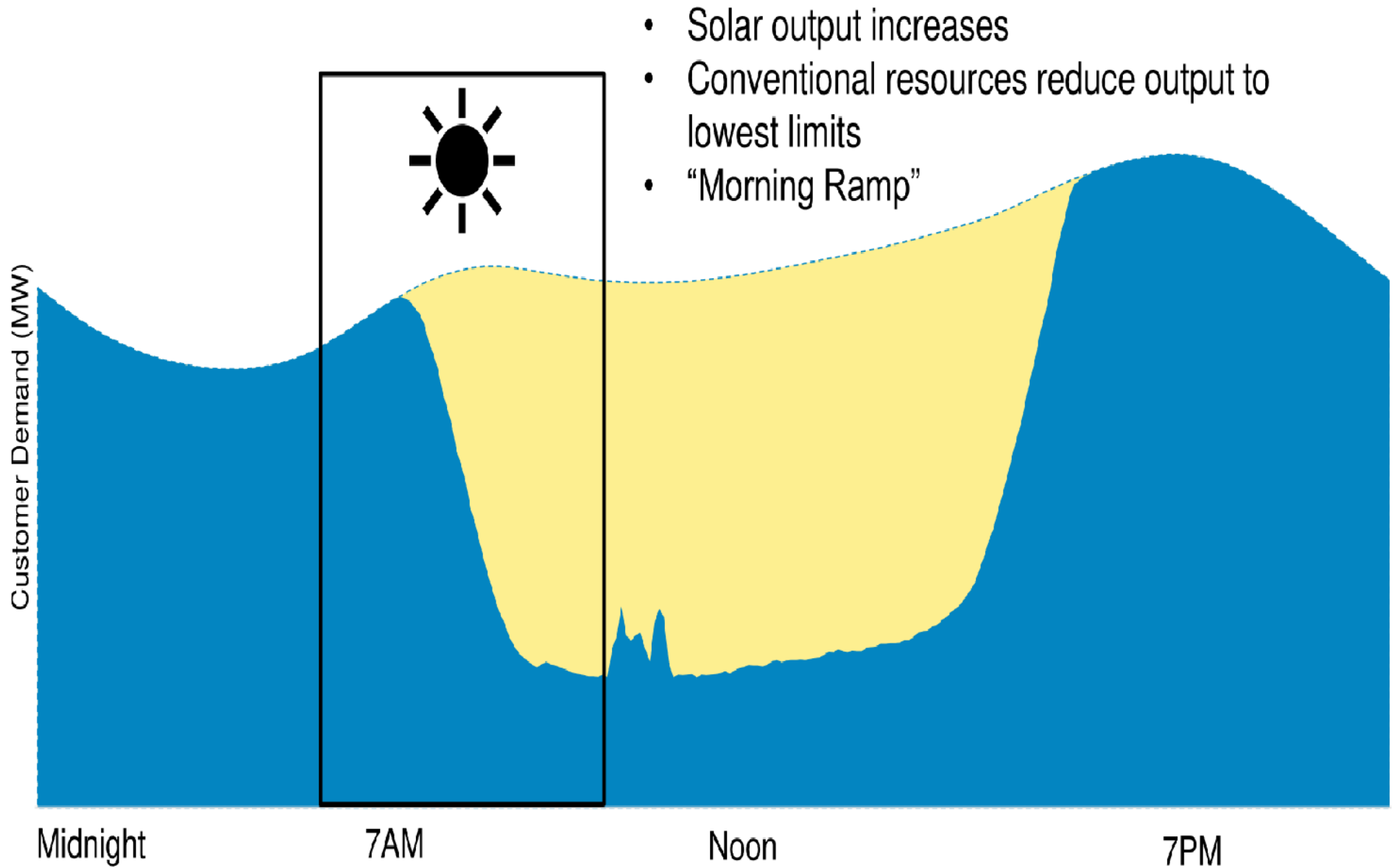


# Integrating Substantial Solar- Midnight to Sunrise

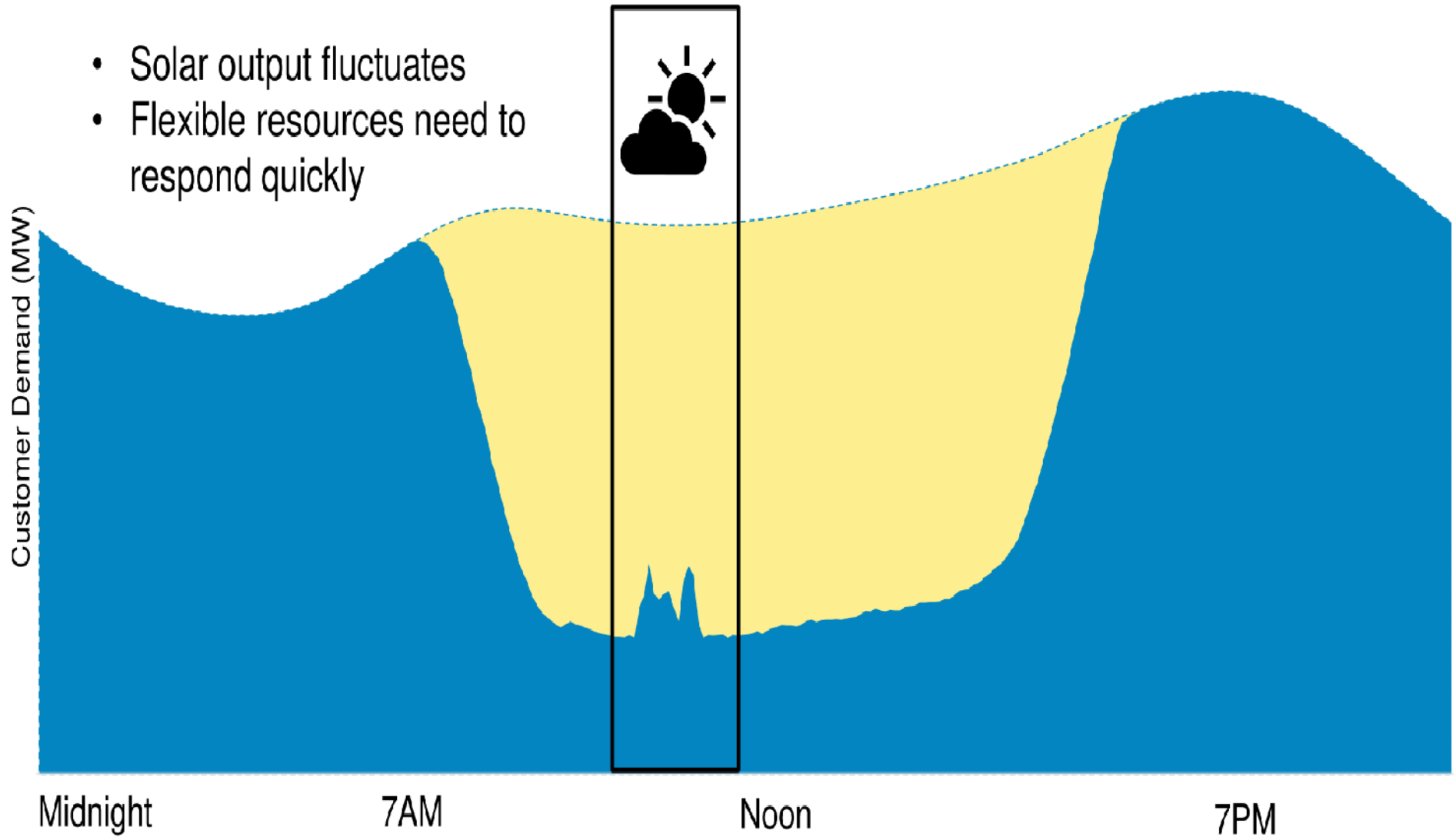




# Integrating Substantial Solar- Sunrise & Morning Hours

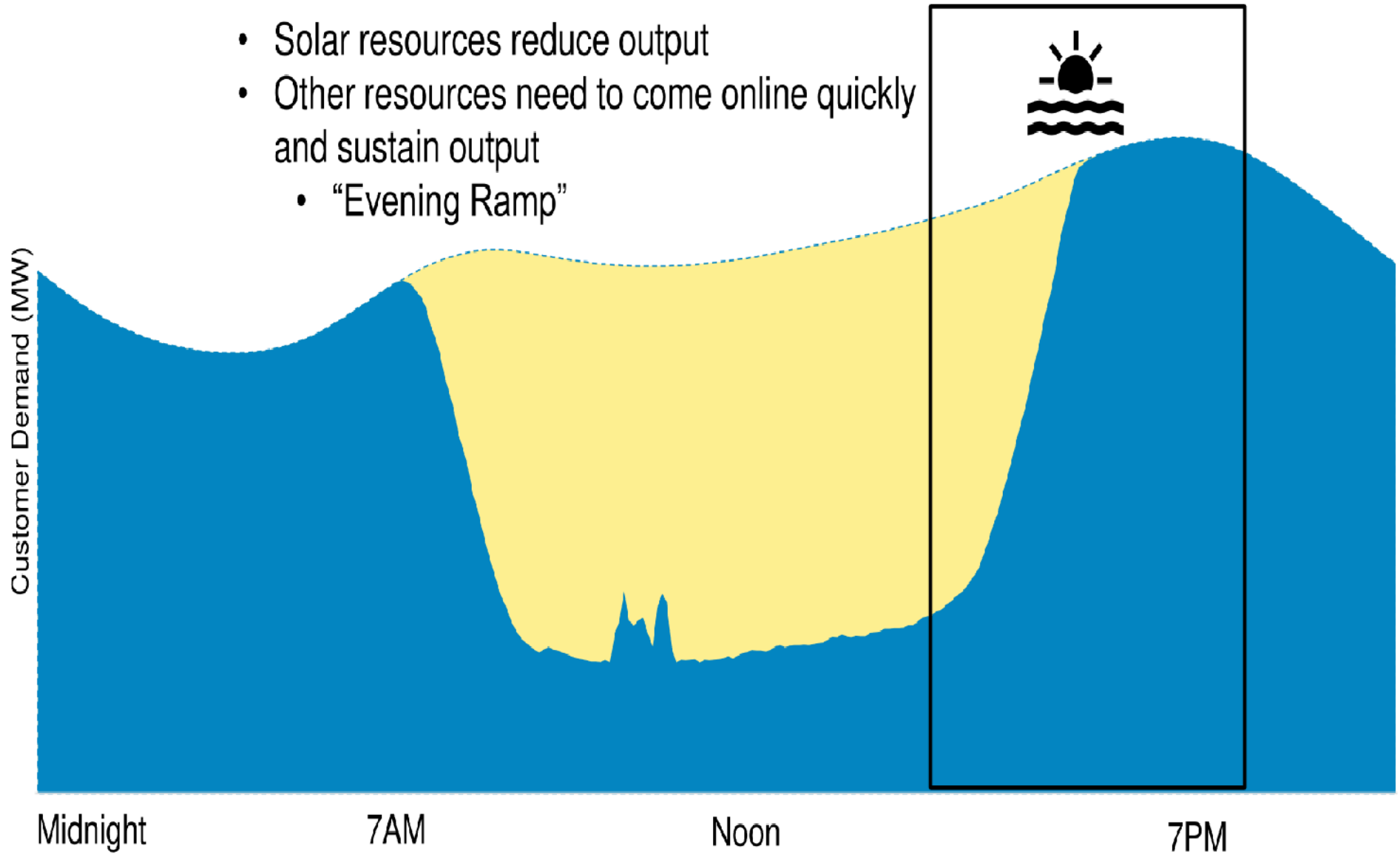


# Integrating Substantial Solar- Cloud Cover



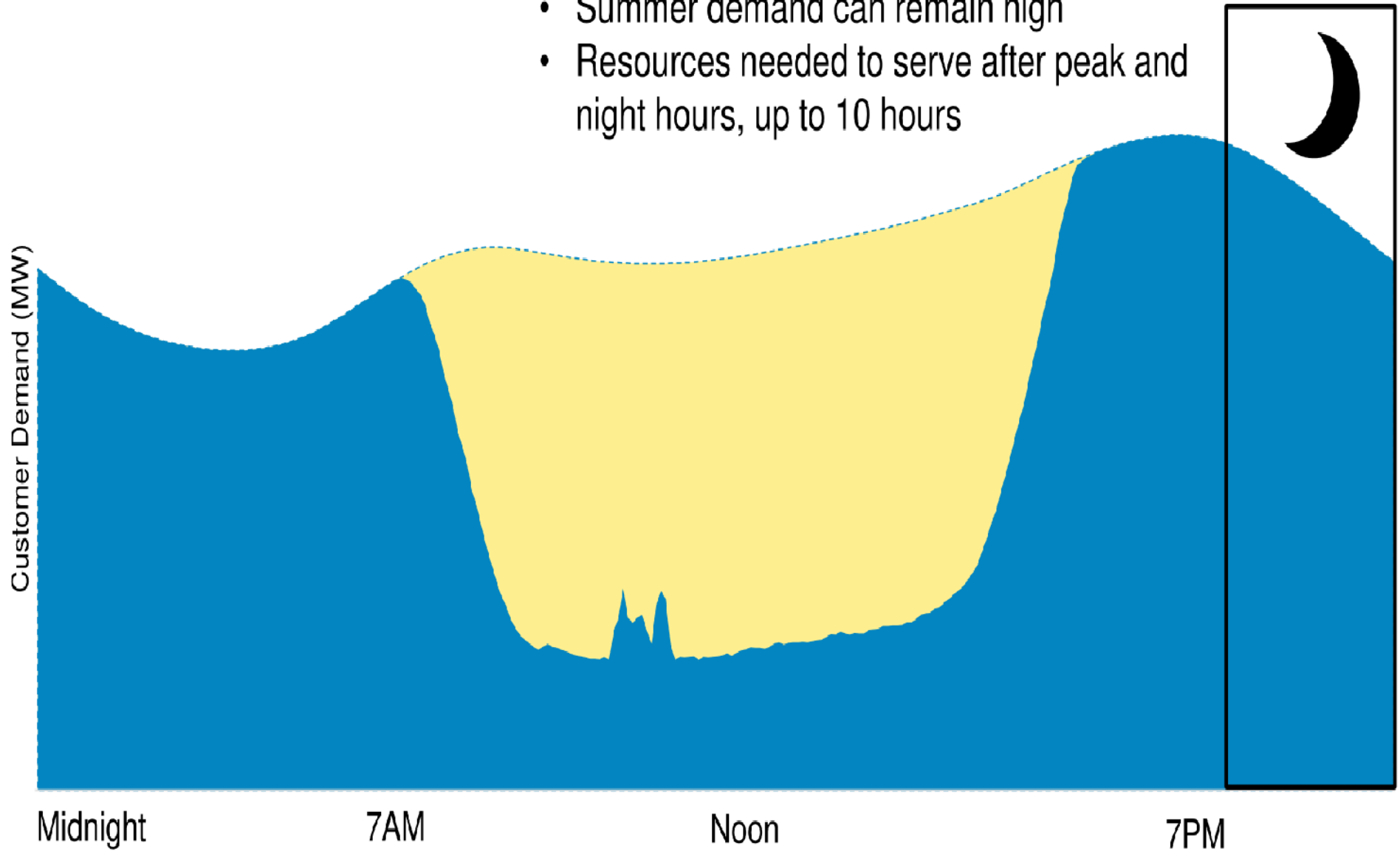
# Integrating Substantial Solar- Sunset and Peak

- Solar resources reduce output
- Other resources need to come online quickly and sustain output
  - “Evening Ramp”

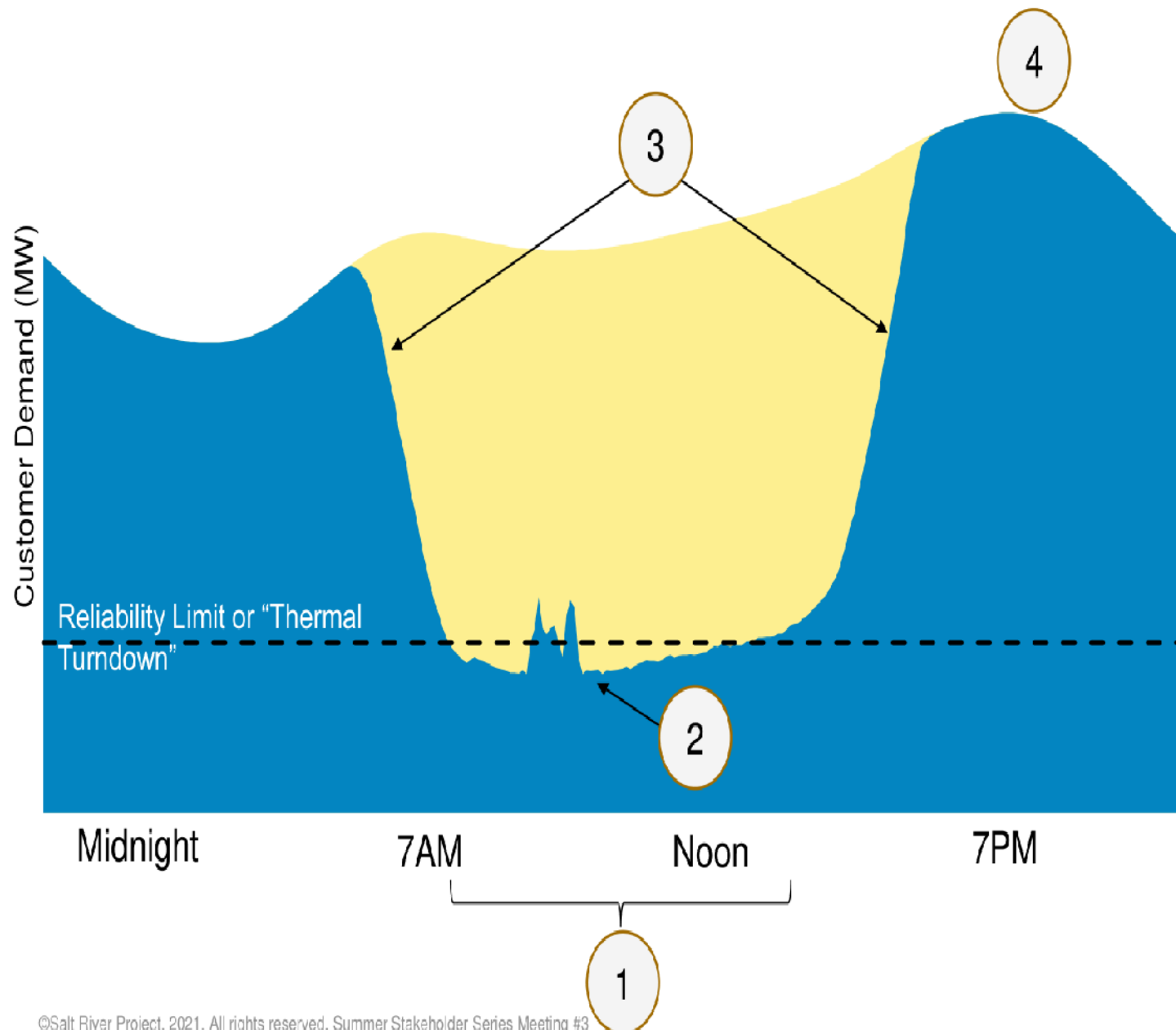


# Integrating Substantial Solar- After Peak to Midnight

- Summer demand can remain high
- Resources needed to serve after peak and night hours, up to 10 hours



# Solar Hosting Considerations



1. Times of potential excess generation  
"Overgeneration"
2. Cloud cover  
"Intermittency"
3. Sunrise and sunset  
"Ramping"
4. Peak demand
5. Stability (not shown)
6. What ifs (not shown)

# What about Batteries?

- Over 30 SRP efforts directed at opportunities to integrate energy storage
- Efforts span laboratory R&D to advancing operational maturity
- Considerations include use cases, locational value, operational requirements, communication standards, safe deployment, environmental life-cycle
- All-of-the-above approach: bulk electric system, distribution grid and customer sited





# Unlocking Battery Potential

## Near-Term Roadmap to 2025

Duration, Size, Chemistry, Charge/Discharge Strategy, Performance, Safety, Controls, Communication, Siting, What's Next?

### Research Projects

- 9 EPRI
- 8 University
- 1 SRP

### Pilots & Studies

- 20 MW
- Innovation Lab
- Transmission Demonstrations
- Distribution Pilots
- Customer Programs Pilots

### Deployment & Engagement

- 372 MW
- Interconnection Standards
- Resource Adequacy

### Performance & Analytics

- Effective Load Carrying Capability (ELCC)

### Partners:



Energy+Environmental Economics

# Reliability Analyses & Planning

## Weather impacts

WEATHER

**Within its first week, October becomes third wettest month for Phoenix**



Capital Weather Gang

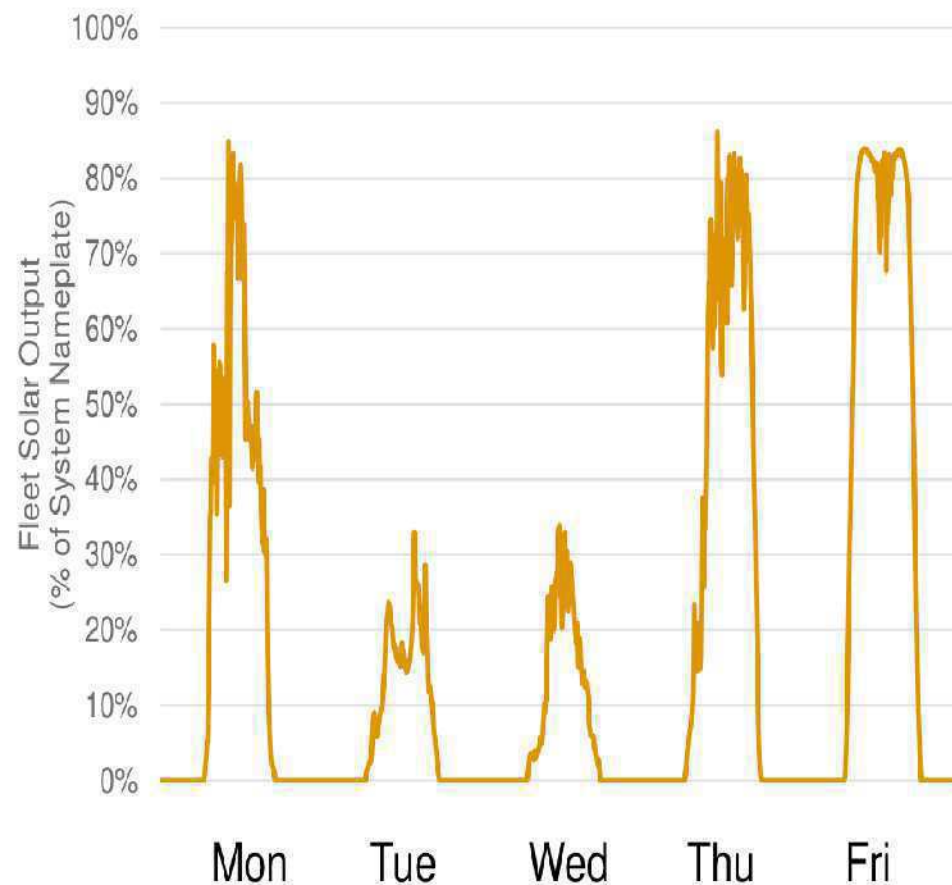
**Heavy monsoon rains to flood the Southwest into this weekend**

Some locations could see a month's worth of rainfall in hours.



Sources: [AZ Central](#), [Washington Post](#)

## Low Solar Output October 2018



# Reliability Analyses & Planning

## What ifs

News

### NERC Warns Energy Shortfalls Almost Inevitable This Summer



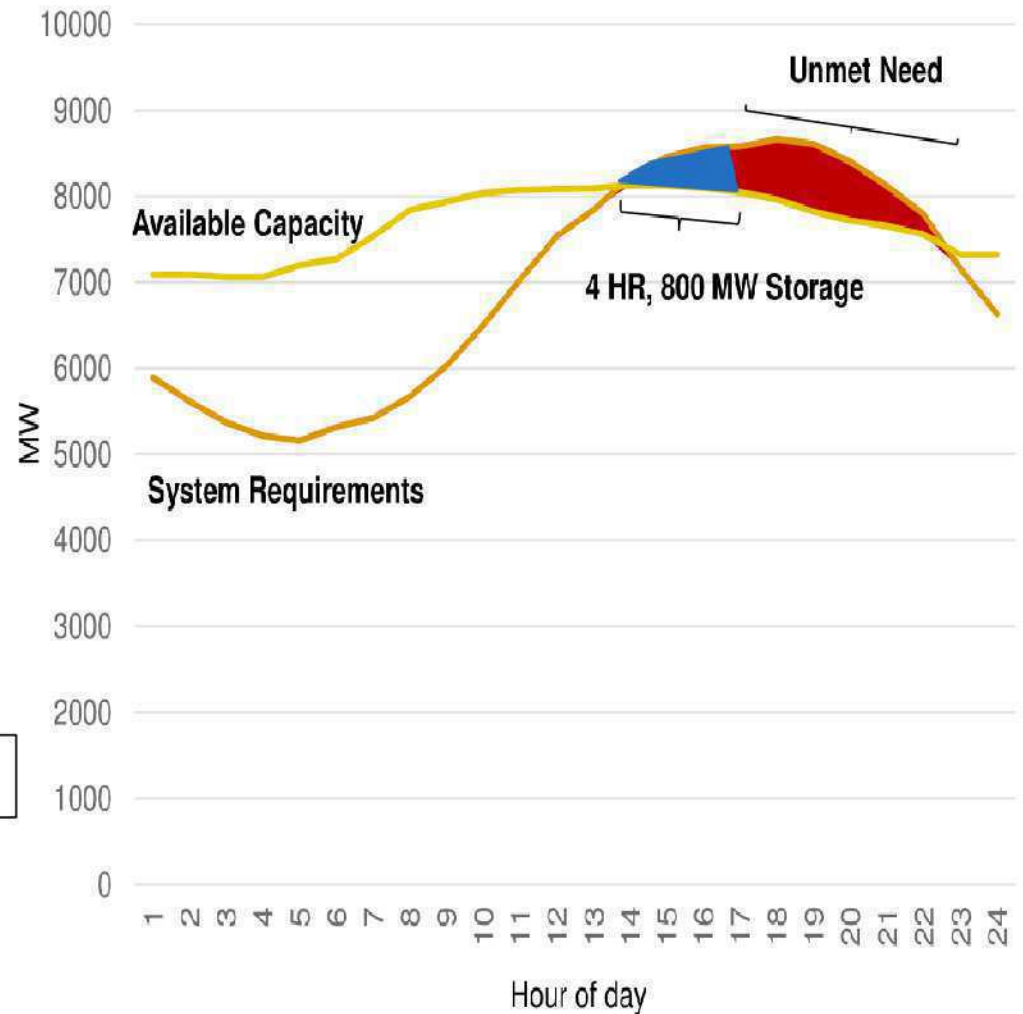
Western officials reckon with reliability challenges as heat and 'wildcard' wildfire threaten grid

Salt Fire near Roosevelt Lake knocks out SRP power line



Sources: [Power](#), [Utility Dive](#), [AZ Family](#)

### Reliability Simulation Summer 2024



# Customer & Grid Enablement

Enable the interconnection of all customer-sided resources while maintaining grid integrity & customer satisfaction.

Enable 500,000 electric vehicles in SRP's service territory and manage 90% of charging.

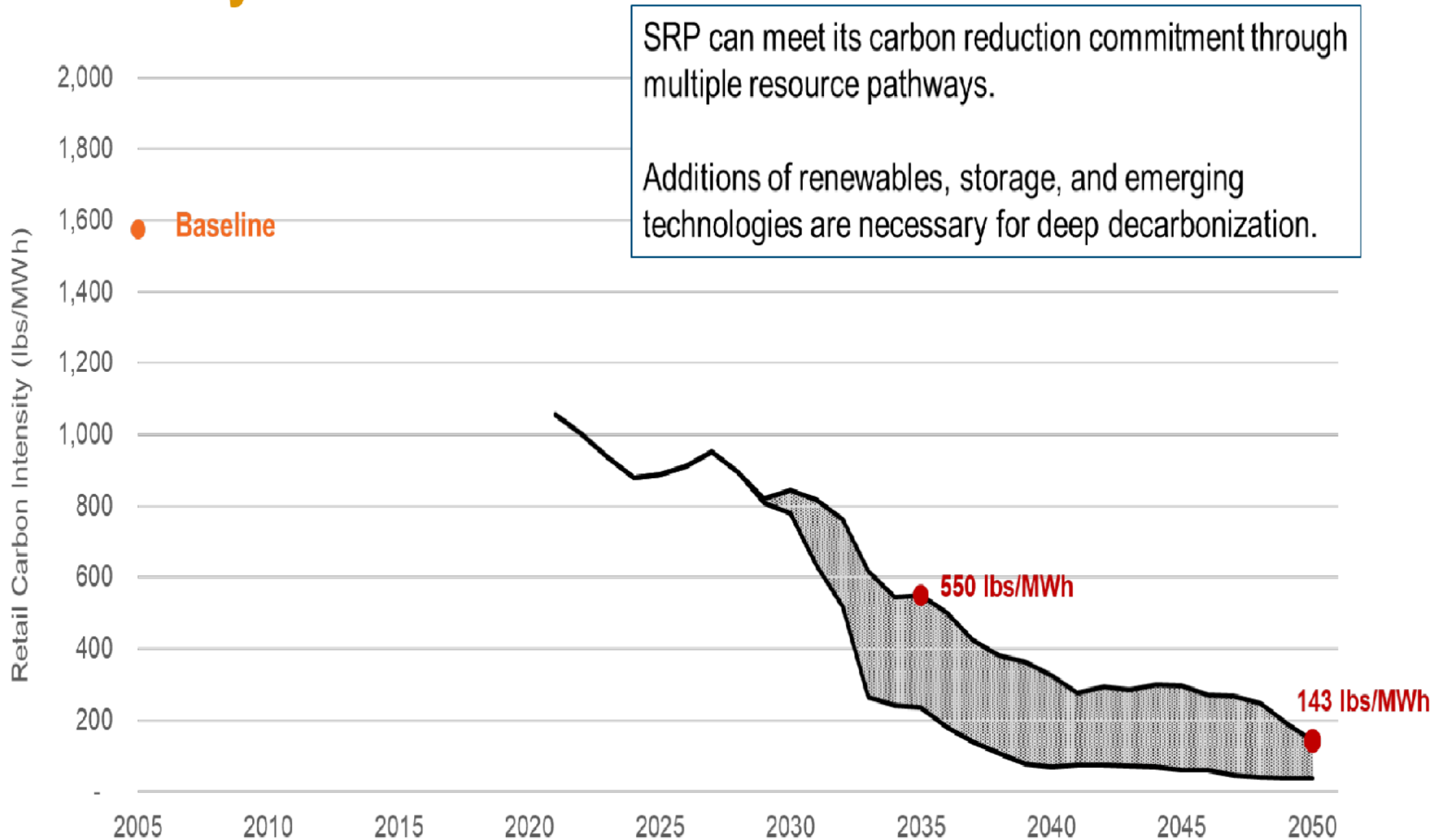
## 5 Key Initiatives





# SRP Carbon Commitment

## Intensity Based





# SRP ISP ROADMAP

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# Prepare Phase Objectives

Identify desired levels of stakeholder involvement and commitment

Understand stakeholder priorities for analysis

Intake perspectives for measures of success

Develop draft analytical approach and data needs assessment

## Next Outreach Timing - November



# Seeking Stakeholder Perspectives

What is most important for SRP to consider and study in the ISP?

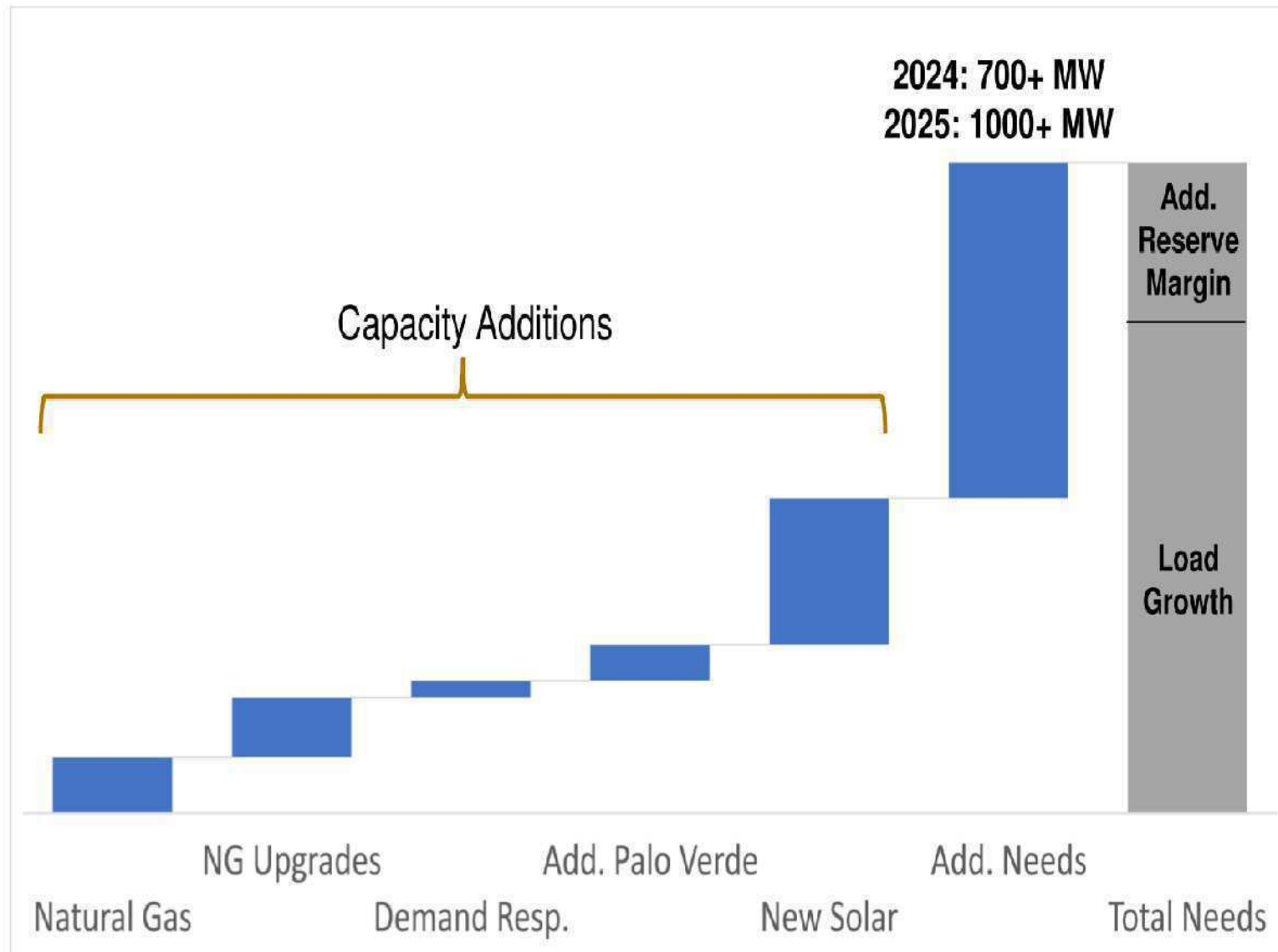
# Q&A

# Next Meeting Preview

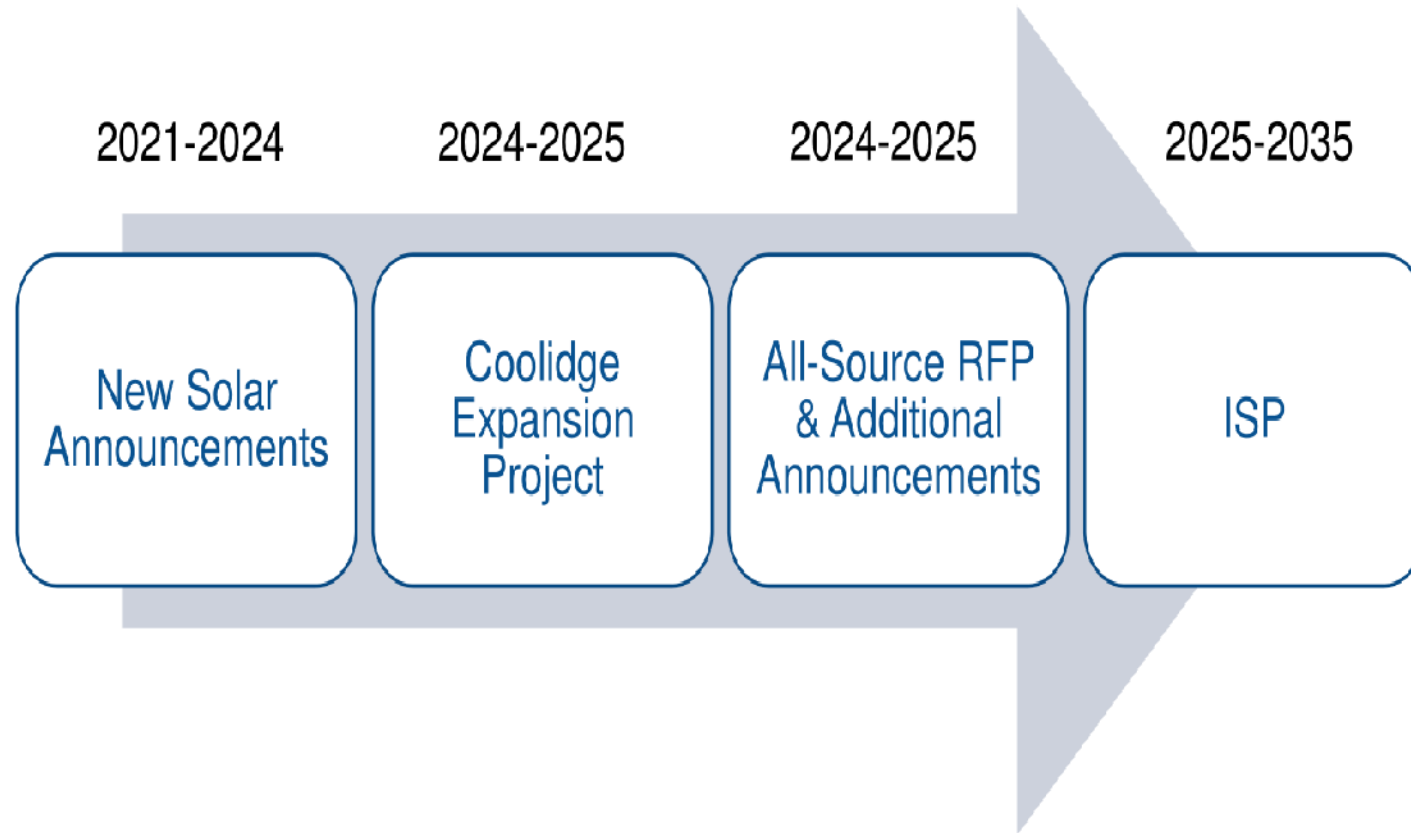
**Grant Smedley, Director**

Resource Planning, Acquisition & Development (SRP)

# Near-Term Resource Additions and Needs



# Addressing Near-Term Needs – “AND” Strategy





# Next Steps & Wrap-up

**Angie Bond-Simpson, Director**  
Integrated System Planning & Support (SRP)

# Next Steps

## Near-Term Resource Plan

- Meeting on Monday 8/23 to inform on SRP's next resource decisions



## Integrated System Plan (ISP)

- Post-meeting feedback survey
- 1:1 phone call to discuss ISP Goals
  - Follow-up with your ISP liaison if you are interested
- Watch for announcements about the upcoming ISP engagement opportunities

**Integrated System Plan: Summer Series Informational Portal**

<https://srpnet.com/about/integrated-system-plan.aspx>

**thank you!**

## Attachment H

# SRP Summer Stakeholder Series – Near-Term Planning: Part 2

August 23rd, 2021

# Welcome

Kelly Barr

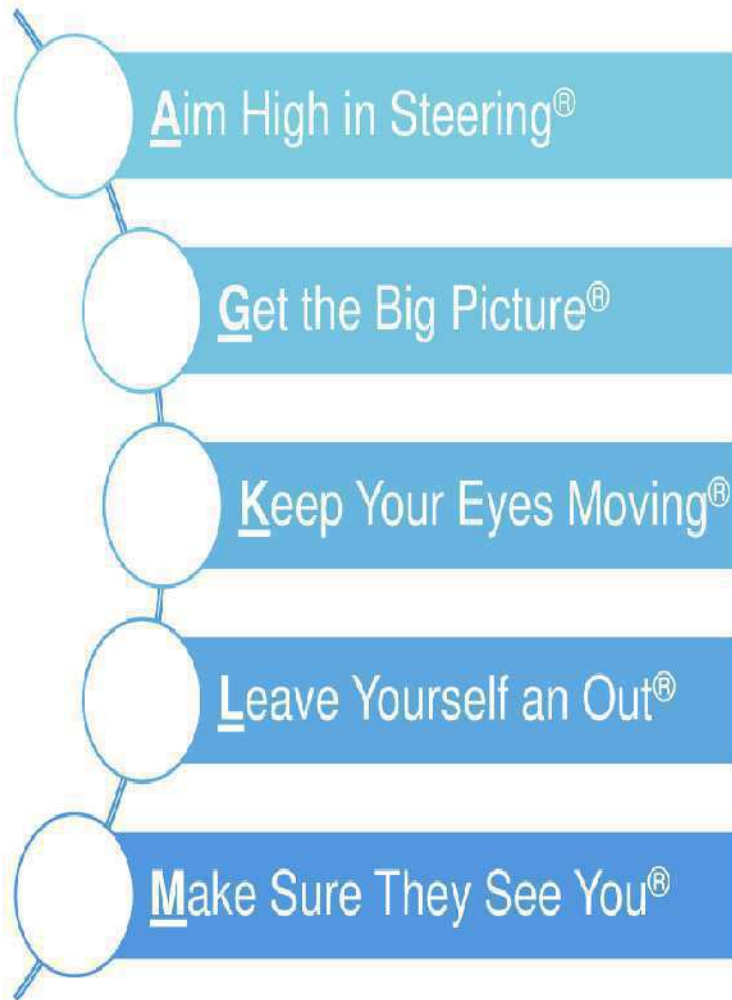
Associate General Manager Chief Strategy and Corporate Services & Sustainability Executive



# Safety & Sustainability Minute

# Safety/Sustainability

## Smith Driving System



## Kitchen waste composting



# Welcome SRP Board and Council Observers



**John Hoopes**  
SRP Vice President



**Randy Miller**  
SRP Board Member



**Anda McAfee**  
SRP Board Member



**Jack White**  
SRP Board Member



**Larry Rovey**  
SRP Board Member



**Suzanne Naylor**  
SRP Council Member



**Rocky Shelton**  
SRP Council Member

# Agenda

Time		Topics	Presenter
10:00-10:10	10 mins	Welcome and Opening Remarks	Kelly Barr
10:10-10:15	5 mins	Agenda Overview and Participation Opportunities	Kearns & West
10:15-11:25	70 mins	SRP's Next Resource Decisions in the Near-Term "AND" Strategy with Q&A	Grant Smedley Dan Dreiling Bill McClellan & Spence Wilhelm SRP Subject Matter Experts
11:25-11:30	5 mins	Next Steps & Wrap-up	Angie Bond-Simpson





# Summer Series and Meeting #4 Overview

Joan Isaacson, Facilitator  
Kearns & West



# ISP Summer Series Overview

## Meeting #1

### Since We Last Met

**Update** on 2017-18 IRP Strategic Resource Directions progress.

## Meeting #2

### Near-Term Planning

**Educate** on forces of change affecting the industry and near-term planning.

**Collect** perspectives from stakeholders.

## Meeting #3

### Where We Want to Go “Long-Term”

**Engage** stakeholders in early development of the ISP.

## Meeting #4

### Near-Term Planning: Part 2

**Inform** stakeholders about the next decisions in SRP’s near-term plan.

# Guides for Productive Virtual Meetings

- Actively participate
- Be respectful of other perspectives
- Listen for understanding
- Stay concise to allow time for everyone to participate
- Enjoy the meeting

# Near-Term Resource Updates & Announcements

Grant Smedley, Director

Resource Planning, Acquisition & Development (SRP)

# Strong Economic Growth Ahead

Maricopa County is the #1 fastest growing county in the U.S.

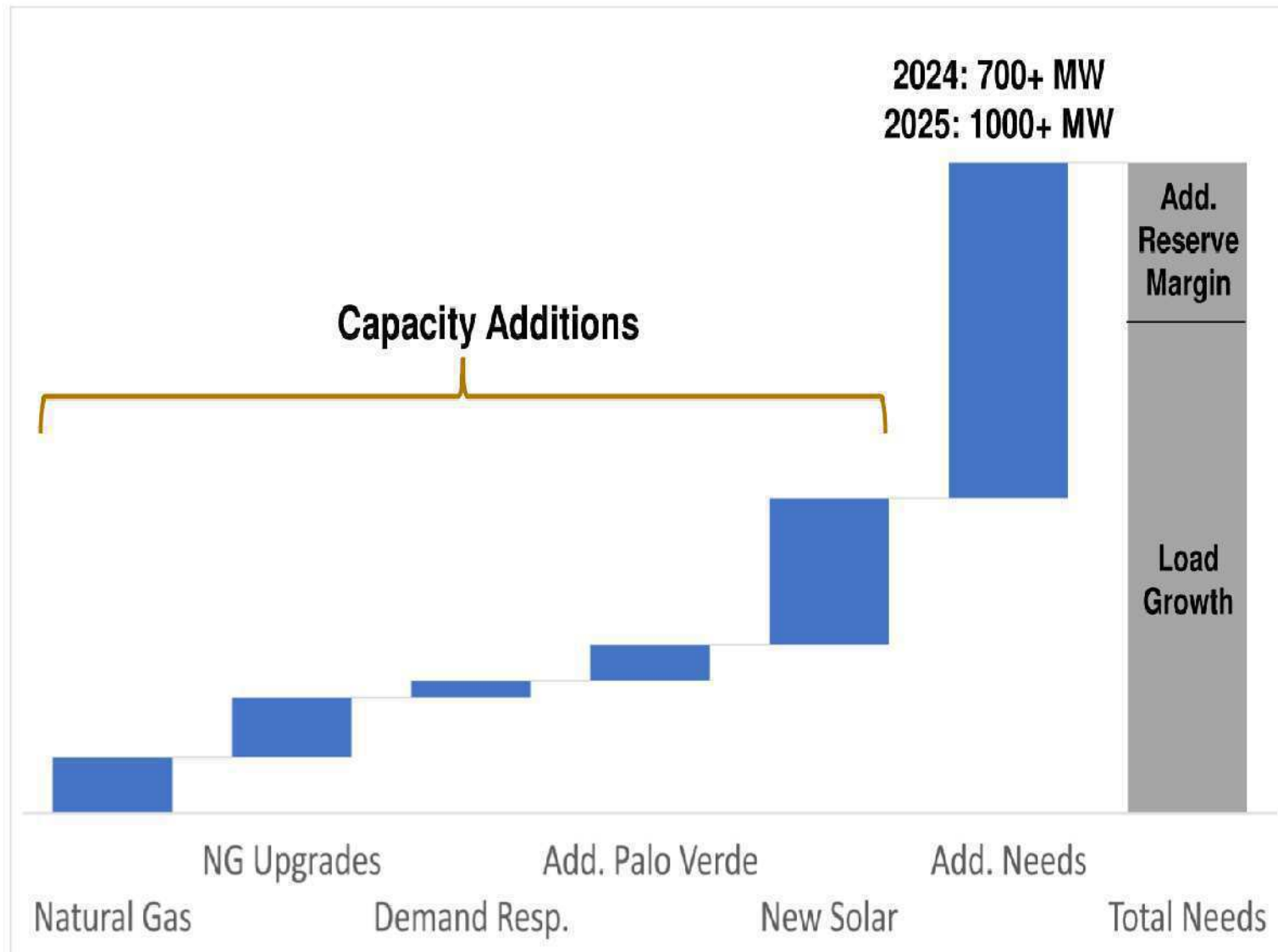
Phoenix is one of only two major cities to have recovered at least 85% of jobs lost during the pandemic.

The Southwest is becoming America's advanced manufacturing hub.

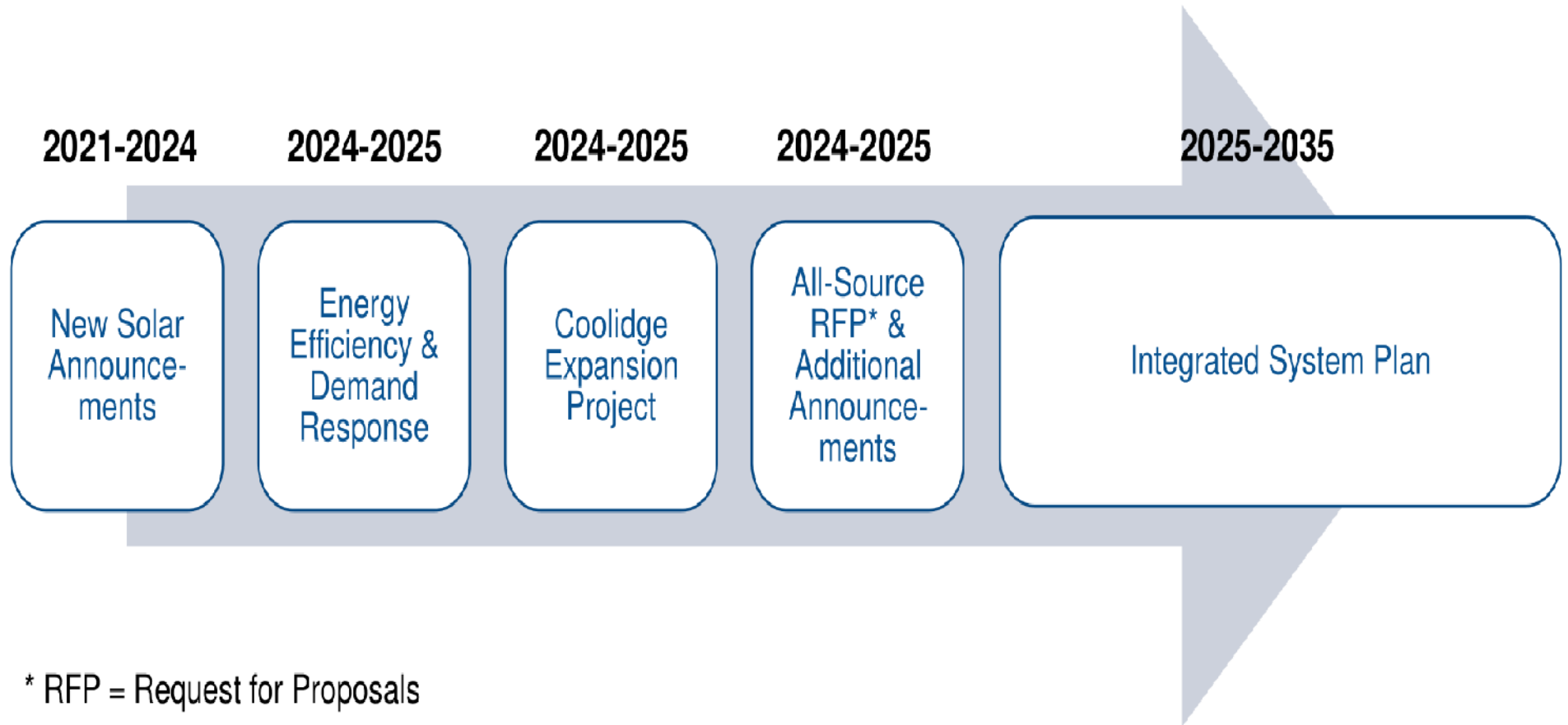
Housing permits are at the highest since mid-2000's: >100/day.



# Near-Term Resource Additions and Needs

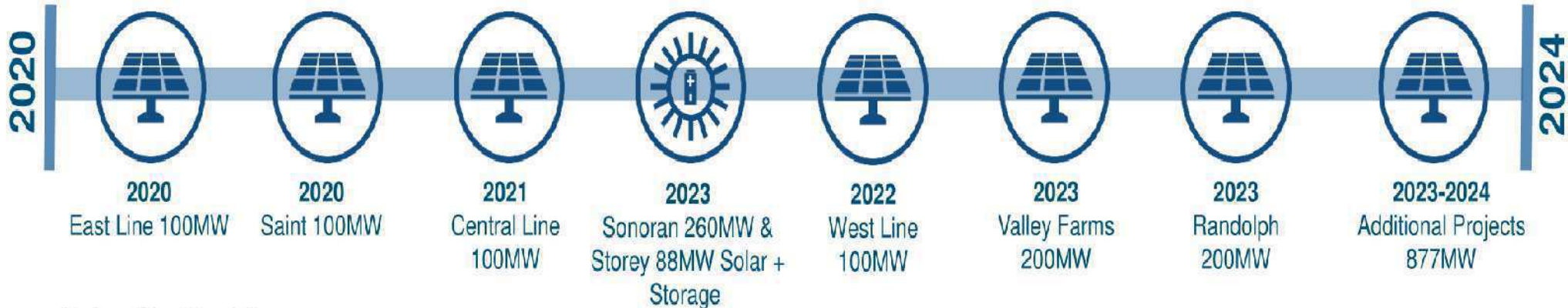


# Addressing Near-Term Needs – “AND” Strategy





# Solar PPA Updates: 500 MW of New Solar PPAs



**Project:** West Line Solar

**Developer:** AES

**Size:** 100 MW

**Status:** PPA Executed

**Commercial Operation Date (COD):** October 2022

**Location:** Eloy, AZ

**Project:** Valley Farms Solar

**Developer:** NextEra Energy Resources

**Size:** 200 MW

**Status:** PPA Executed

**Commercial Operation Date (COD):** December 2023

**Location:** Coolidge, AZ

**Project:** Randolph Solar

**Developer:** EDP Renewables North America

**Size:** 200 MW

**Status:** PPA Executed

**Commercial Operation Date (COD):** June 2023

**Location:** Coolidge, AZ

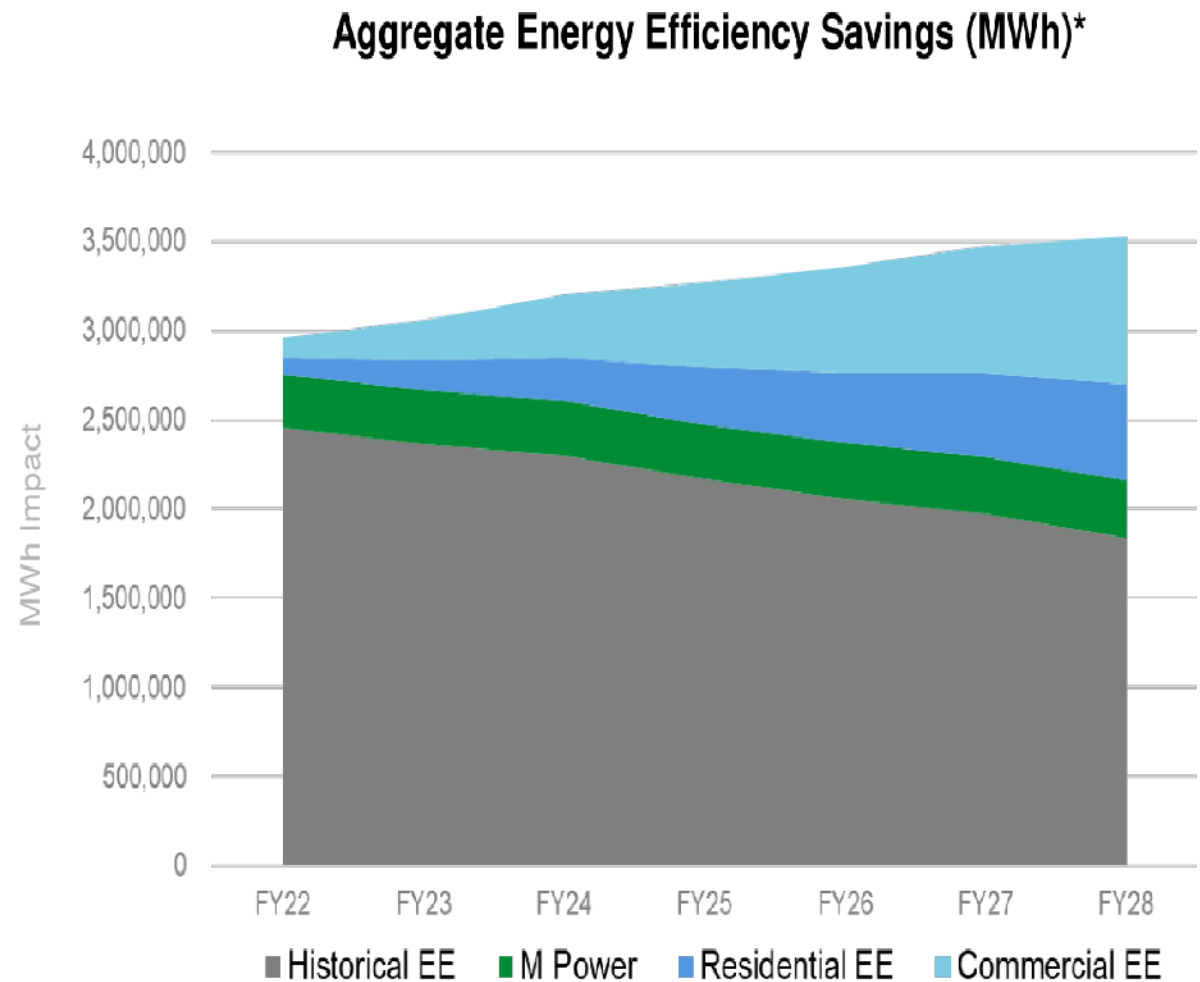


# Customer Program Progress

Dan Dreiling, Director  
Customer Programs (SRP)

# Energy Efficiency Update: Increasing MWh Savings

- Portfolio energy savings will grow as committed to in 2035 Sustainability goals
- Focus on A/C related measures, business programs, underserved market segments and smart thermostats
- Aggregate energy savings impact on load forecast



*\* Represents historic program performance from 2000 to present and future portfolio plans utilized for load forecasting purposes*

# Demand Response Update: Growing to 150 MW

- Grow DR portfolio capacity to deliver 150 MW by summer of CY22
- Accelerate program growth by two years through aggressive marketing and recruitment efforts
- Evaluate new interruptible offers and additional program growth

Demand Response Capacity Plan			
	CY20	CY21	CY22
FP21 Plan (MW)	67	95	120
Incremental Bring Your Own Thermostat		+5	+15
Incremental Business Demand Response		+10	+15
FP22 Plan (MW)	67	110	150

# Q&A

# Coolidge Expansion Project

Bill McClellan, Manager

Spence Wilhelm, Manager

Coolidge Expansion Project (SRP)



# Considerations for Near-Term Capacity Additions

## Maintaining Reliability

Technology maturity  
Timely development  
Available when needed



## Sustainability Commitments

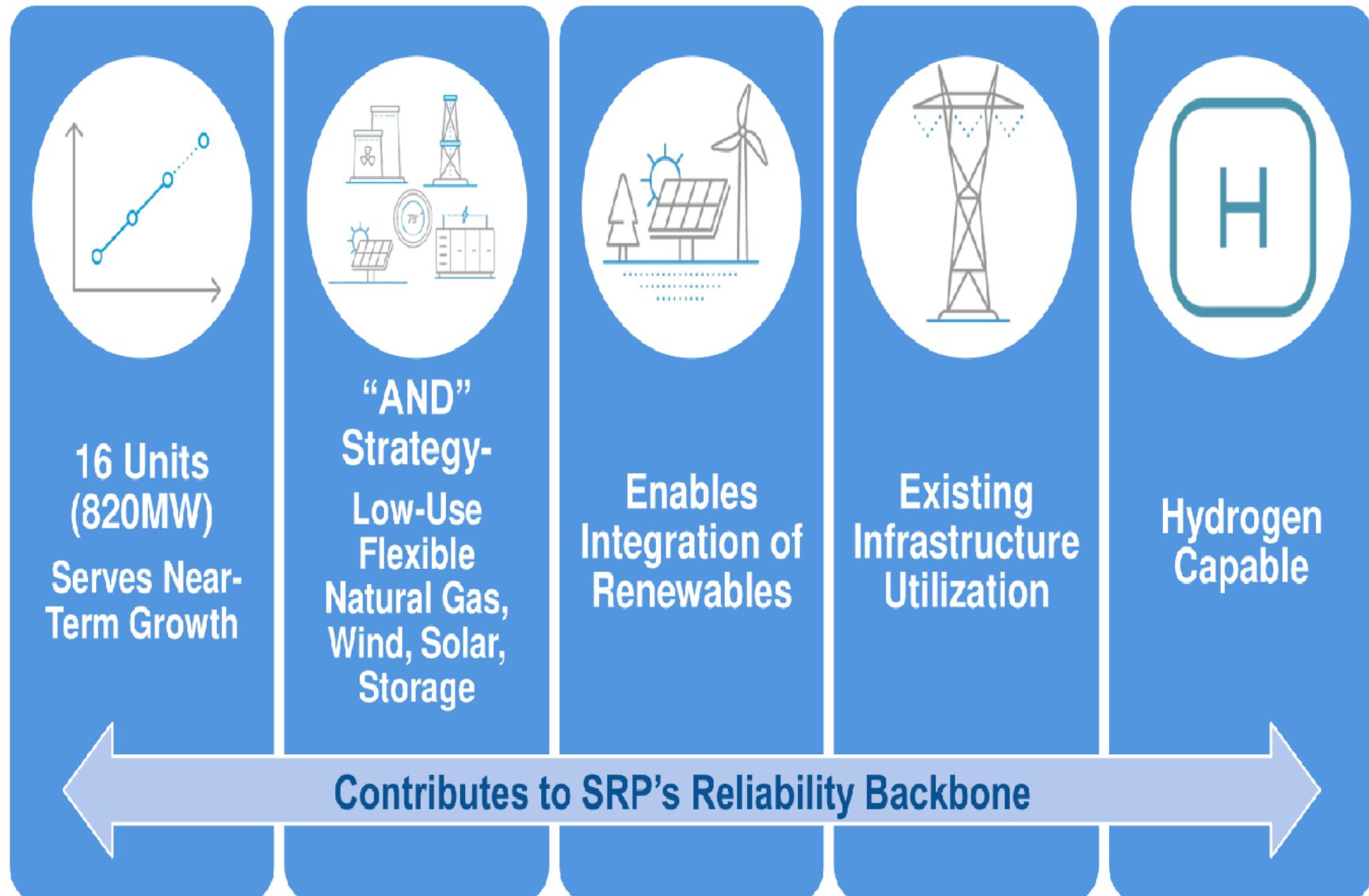
Carbon  
Water



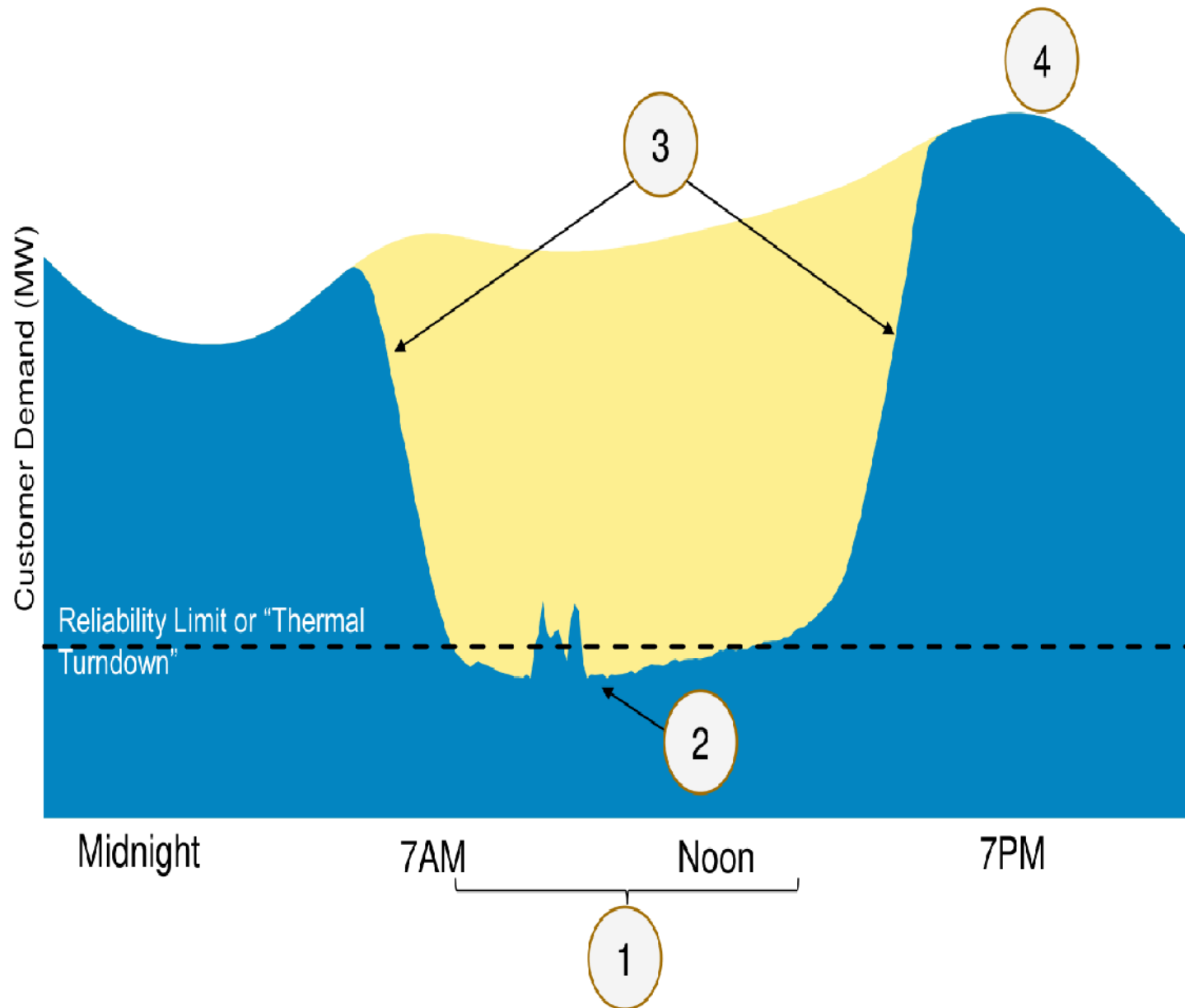
## Affordability

Cost stability  
Investment longevity  
Lowest quartile prices regionally

# Recommendation – Coolidge Expansion

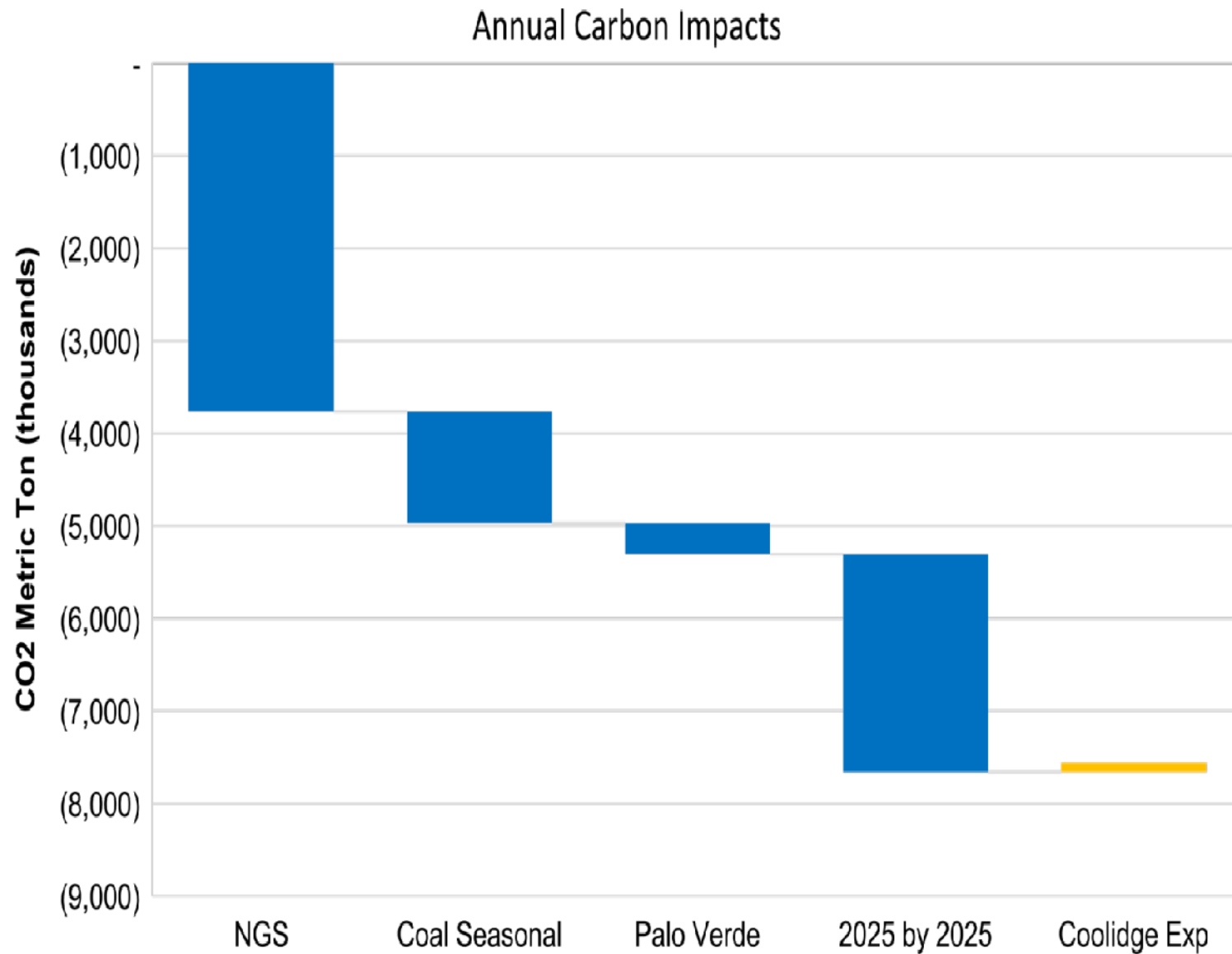


# Integration of Renewables



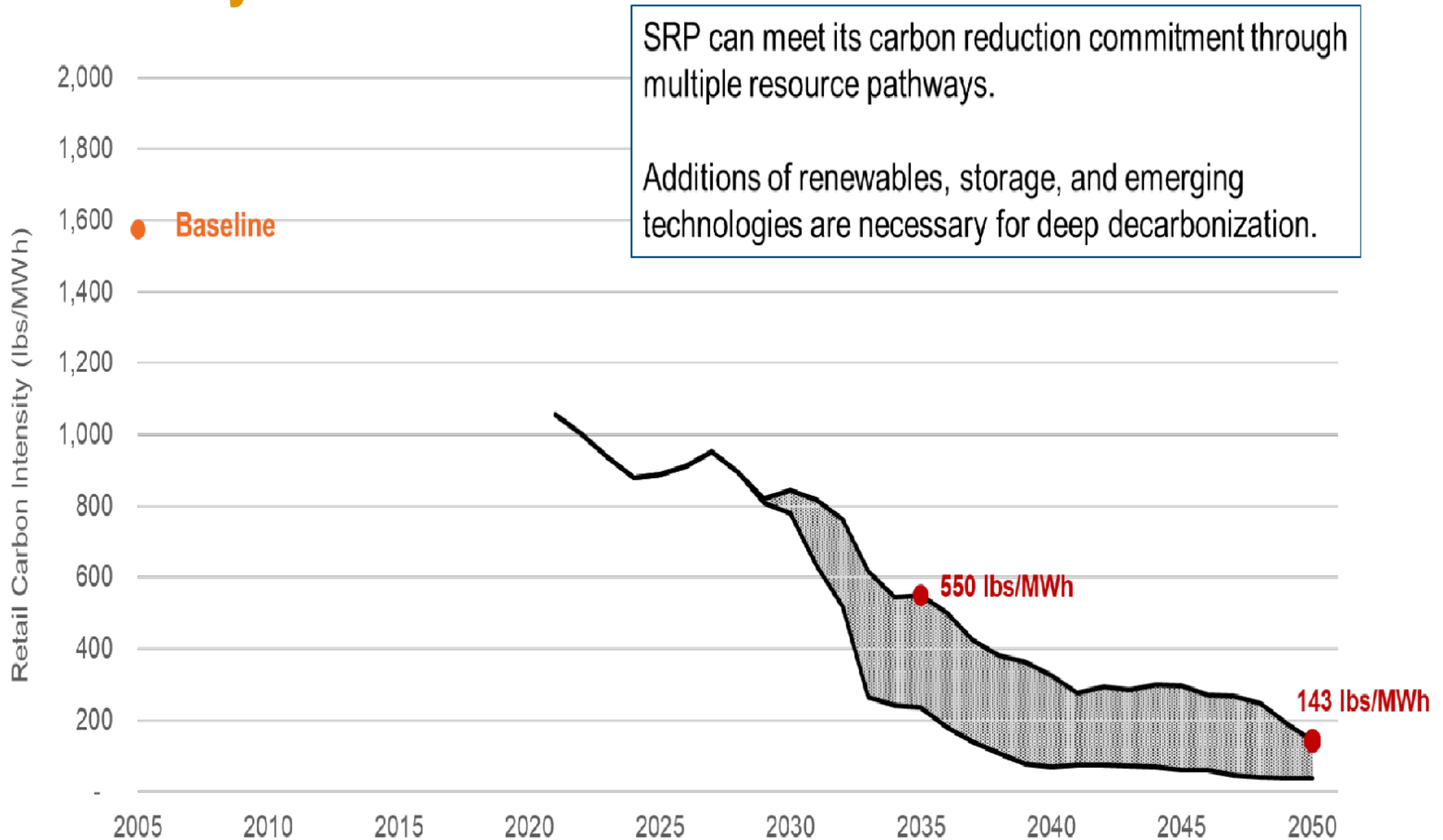
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5. Stability (not shown)
6. What ifs (not shown)

# CO<sub>2</sub> Emission Comparison



# SRP Carbon Commitment

## Intensity Based



# Alternatives – Why not add more Battery Storage?

- Adding ~400 MW by 2023
- Limited discharge duration
- No long-term performance data
- Lack of operational experience
- Supply chain risks (2024 need)

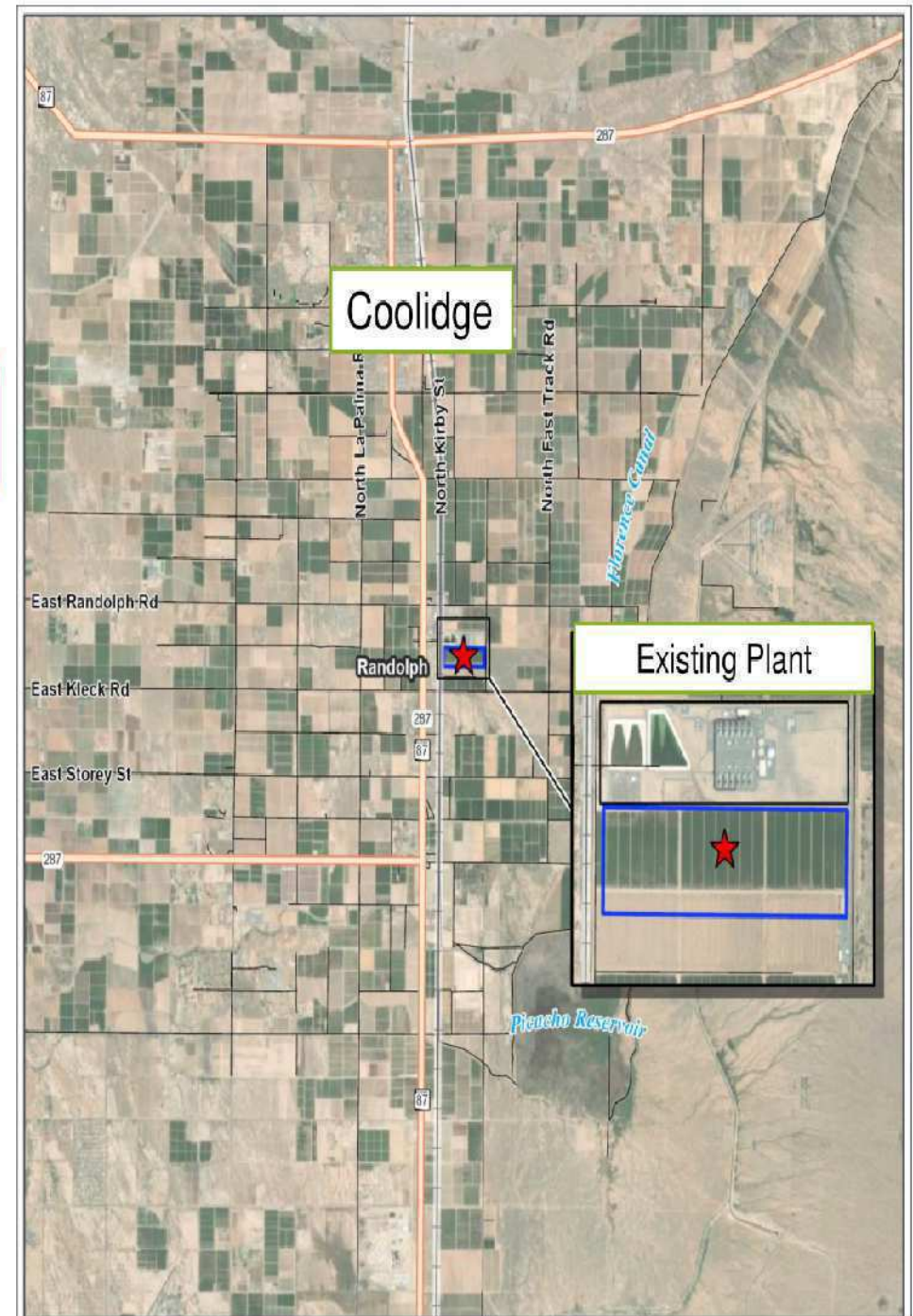




# Existing Coolidge Facility

## Natural Gas Fired – Simple Cycle

- 12 aeroderivative gas turbines (GE LM6000)
- 615 MW nameplate capacity
- Built in 2008 by TransCanada
- Purchased by SRP in 2019
- Best available emission controls



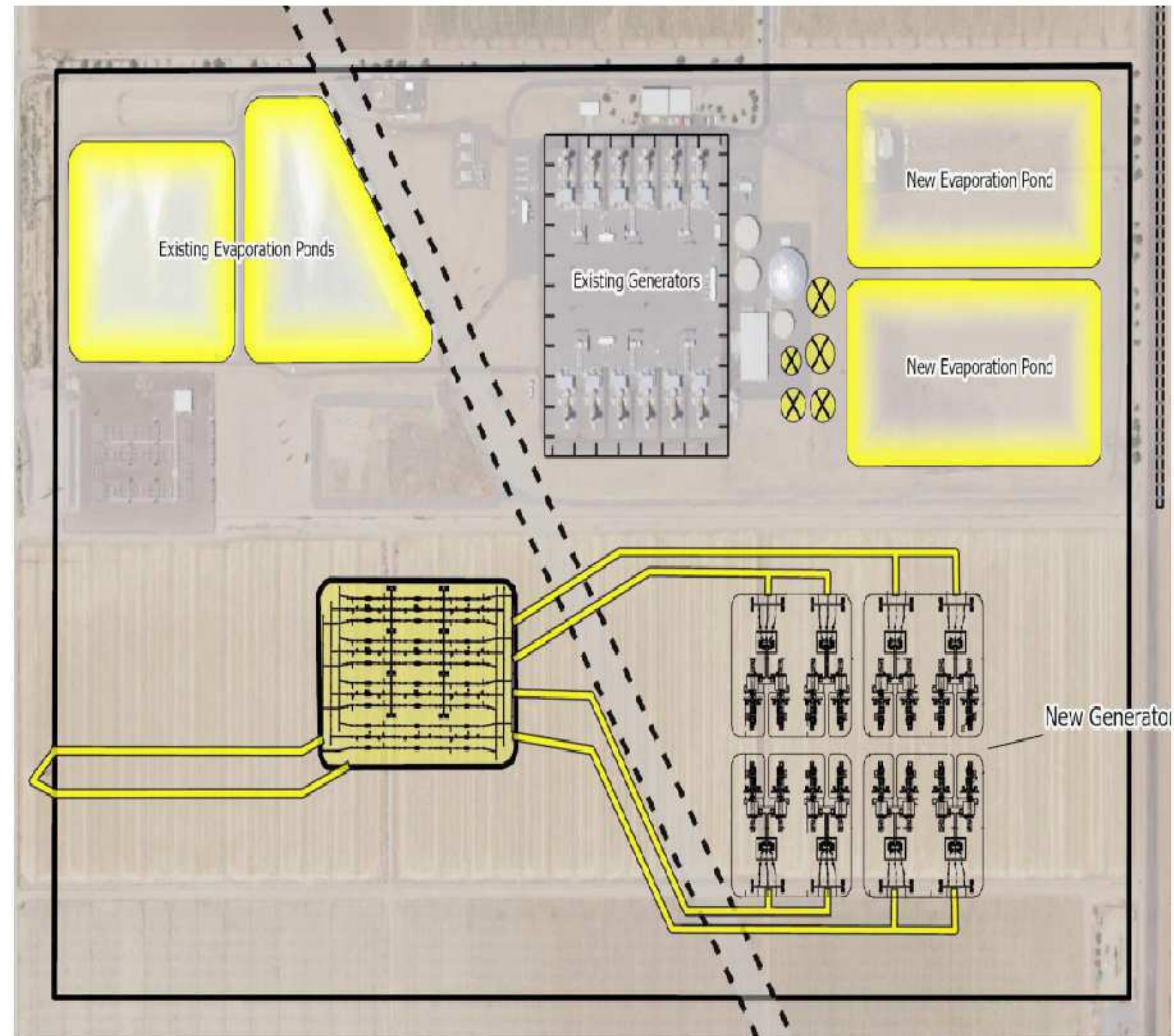
# Coolidge Expansion

## Expansion Scope

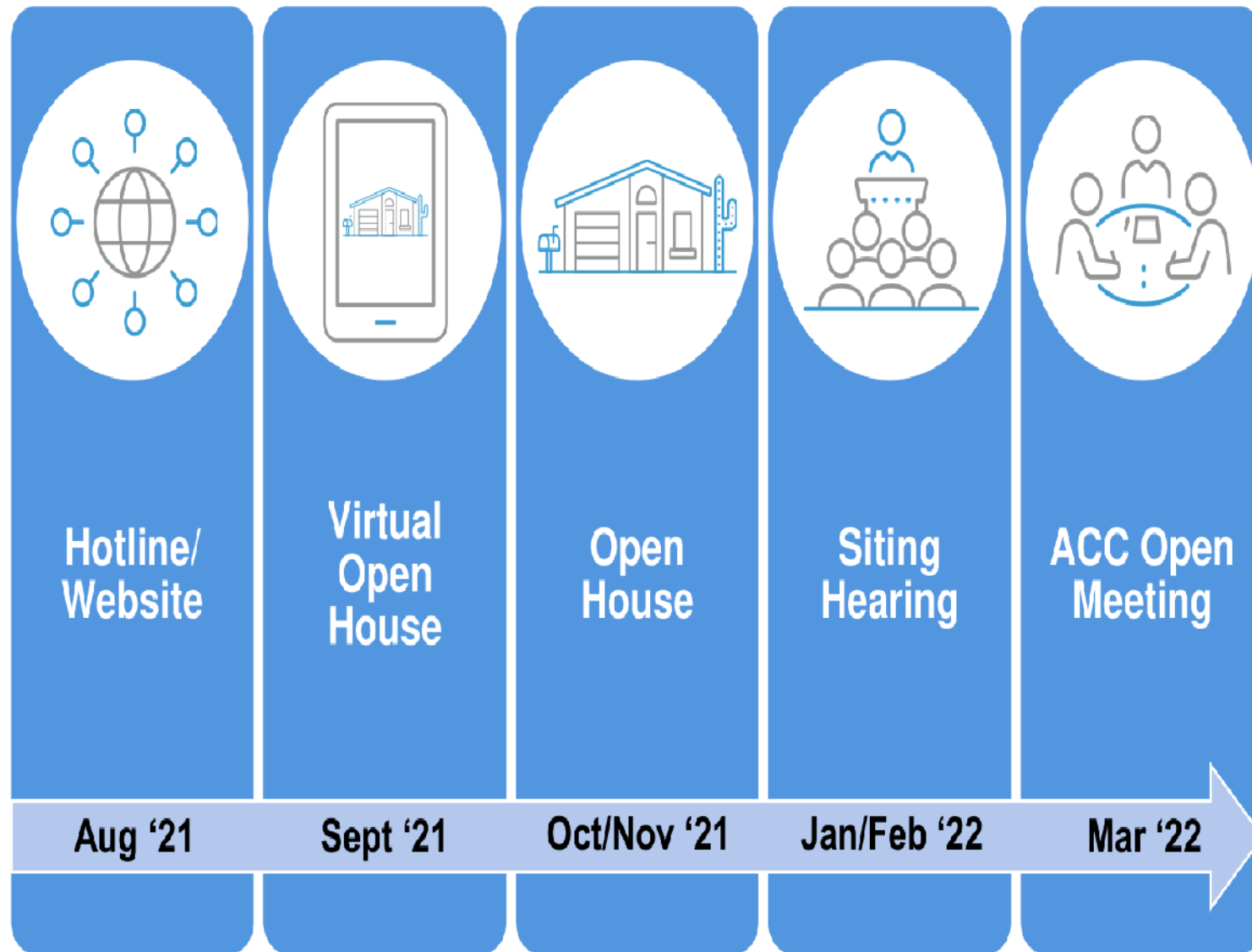
- 16 additional aero. gas turbines
- 8 in 2024, 8 in 2025
- 820 MW nameplate capacity
- Best available emission controls
- 500 kV switchyard

## Leverage Existing Infrastructure

- Two natural gas pipelines
- Sufficient water supply
- 500 kV and 230 kV transmission



# Opportunities for Public Involvement



# Q&A

# ISP Next Steps & Wrap-up

Angie Bond-Simpson, Director  
Integrated System Planning & Support (SRP)



# Community Stakeholder Engagement Focus by Topic

## Near-Term Actions

- SRP to inform stakeholders on recommended actions to meet near term system needs
- Focused on 2021-2025 timeframe

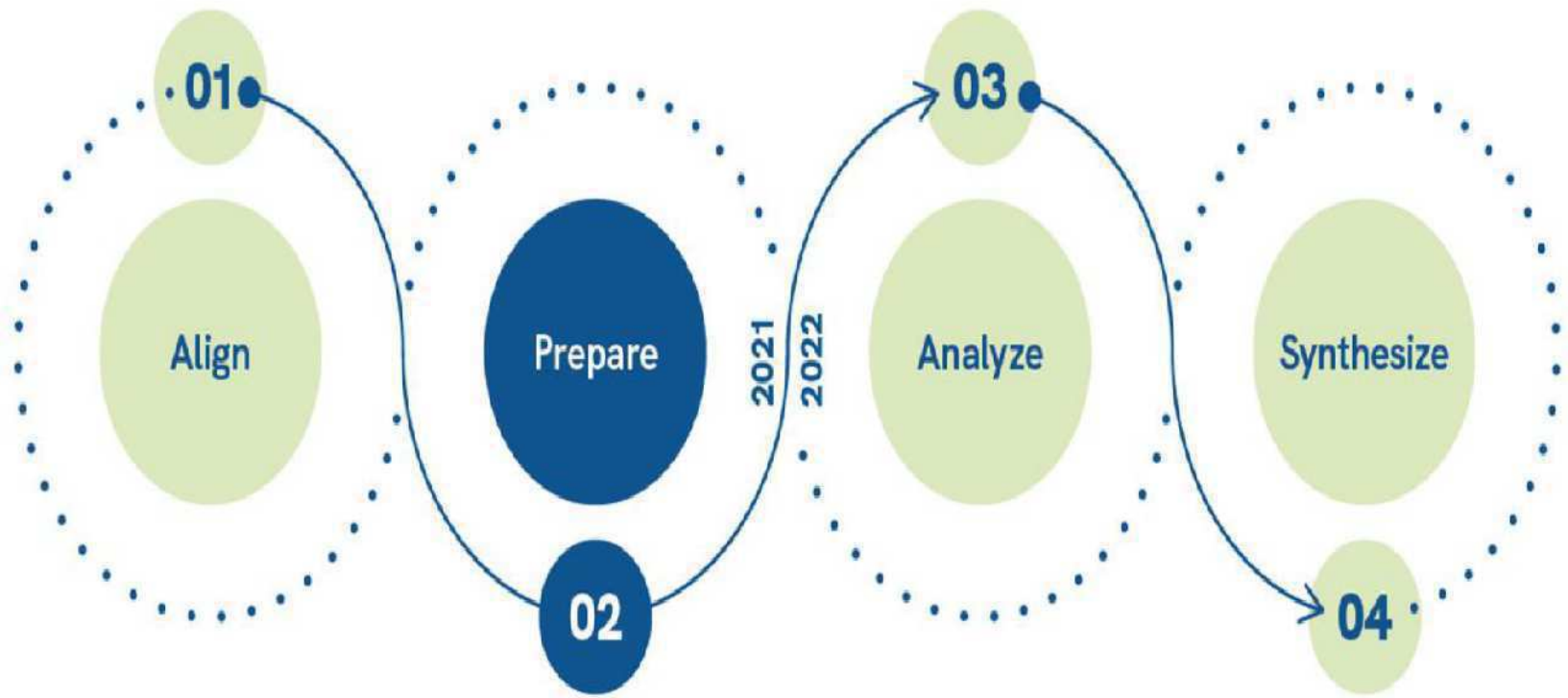
## Integrated System Plan (2025-2035)

- SRP to consult with stakeholders to provide input on pathways for ISP analysis
- Stakeholders to discuss preferences on affordability, sustainability, and reliability metrics
- SRP to share inputs, assumptions, and results with stakeholders

## 2035 Sustainability Advisory Group

- Stakeholders advise on development and 5-year updates to SRP's sustainability goals
- SRP to share annual progress toward 2035 targets
- SRP and stakeholders to discuss opportunities for collaborative sustainability partnerships





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### ISP Summer Series Meeting 3 "Where We Want to Go":

Engage stakeholders in early development of the ISP.

### ISP Summer Series Meeting 4 "Near-term Planning: Part 2":

Inform stakeholders about the next decision in SRP's near-term plan.

### ISP Goals:

Discuss objectives for the ISP.

### Routine SRP Elected Officials and Leadership Updates:

Share updates on progress to date.

### ISP Metrics & Scenario Workshops:

Determine measures of success and what to test.

### Routine SRP Elected Officials and Leadership Updates:

Share updates on progress to date.

### ISP Analytical Framework Overview:

Review approach to the ISP analysis and share inputs and assumptions.

### ISP Analysis Update(s):

Share updates on progress to date.

### ISP Draft Results:

Preview the ISP before it's finalized.

### Routine SRP Elected Officials and Leadership Updates:

Share updates on progress to date and align on final ISP.

### ISP Final Results & Recommendations:

Share finalized ISP and next steps.

# ISP Next Steps



## Integrated System Plan (ISP)

- Feedback survey on ISP Summer Stakeholder Series
- 1:1 phone call to discuss ISP Goals
  - Follow up with your ISP liaison if you are interested.
- Watch for announcements about the upcoming ISP engagement opportunities.

**Integrated System Plan: Summer Series Informational Portal**  
<https://srpnet.com/about/integrated-system-plan.aspx>

**thank you!**